Northern California's Computer Magazine February 6, 1995 • #133 **FREE**

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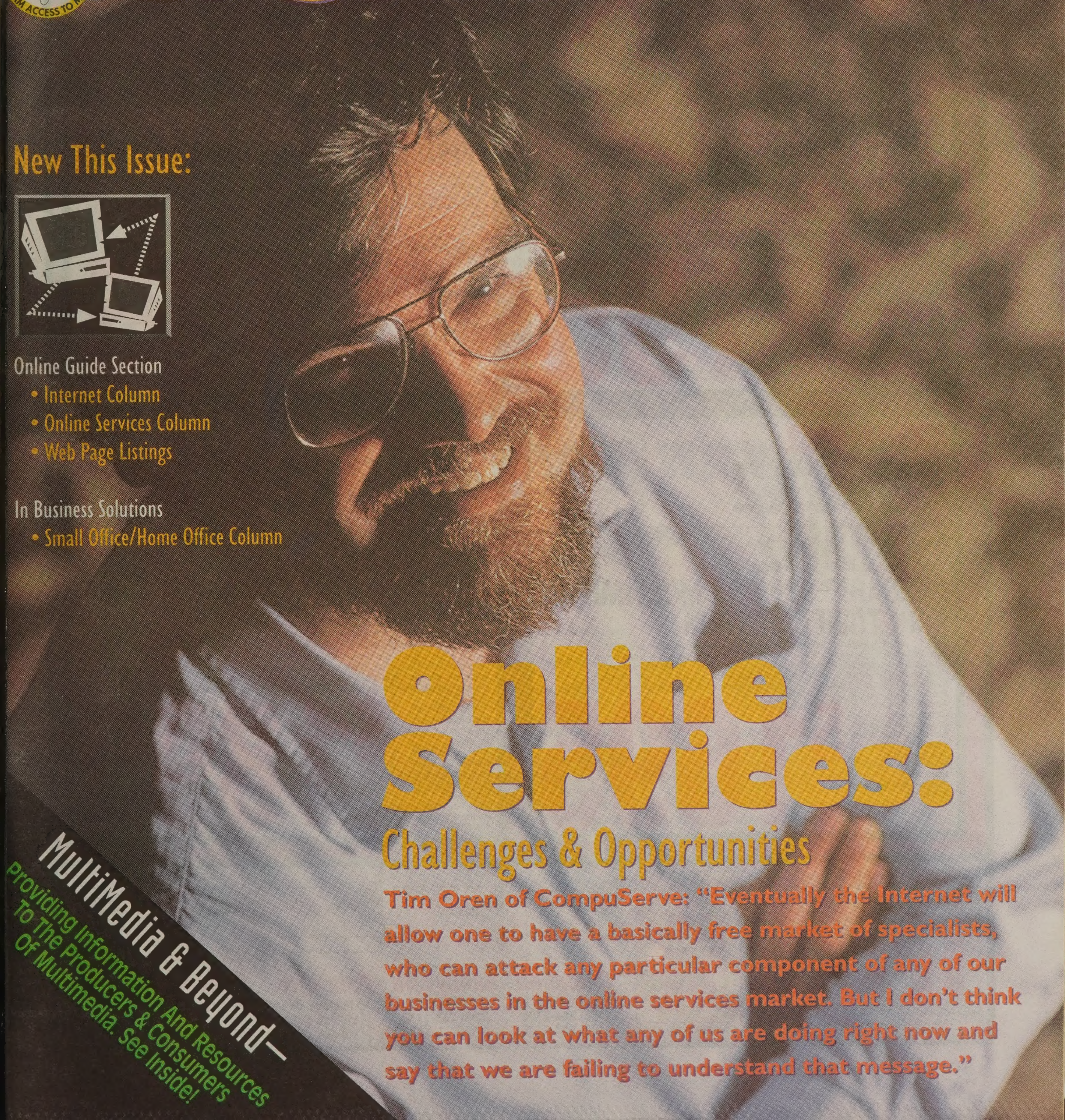

New This Issue:

Online Guide Section
- Internet Column
- Online Services Column
- Web Page Listings

In Business Solutions
- Small Office/Home Office Column

Online Services:

Challenges & Opportunities

Tim Oren of CompuServe: "Eventually the Internet will allow one to have a basically free market of specialists, who can attack any particular component of any of our businesses in the online services market. But I don't think you can look at what any of us are doing right now and say that we are failing to understand that message."

MultiMedia & Beyond—
Providing Information And Resources To The Producers & Consumers Of Multimedia. See Inside!

COMPAQ

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486SL 25MHz

COMPAQ
CONTURA AERO

CONTURA AERO 4/25 170MB SUPER LIGHT NOTEBOOK

486SL 25MHz CPU • 170MB Hard Drive • 4MB RAM expandable to 12MB EasyPoint Trackball 76-Key Keyboard • Integrated speaker • MS-DOS 6 Microsoft Windows • WinLink Transfer Utility with cable • Lotus Organizer TabWorks • Online Documentation • 3 Year Limited Warranty Model does not include an integrated 3.5" 1.44 MB Floppy Drive
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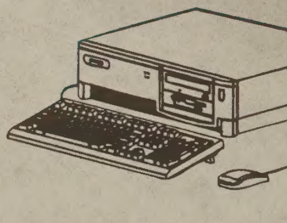
486SX2 66MHz



PRESARIO 720 CDS MULTIMEDIA SYSTEM

486SX2-66MHz CPU • 420MB Hard Drive • 4MB RAM expandable to 64MB • 1MB VRAM expandable to 2MB • 3 ISA expansion slots • Dual-Speed Internal CD-ROM 16-Bit Stereo Sound Card • Built-In Speakerphone • Internal Fax/Modem Preinstalled software: MS DOS 6.2 • MS Windows 3.1 • TabWorks • Quicken • Media Pilot Welcome Center • MS Encarta CD • MS Works CD • Prodigy • America On-Line CompuServe • ImagiNation Network • Home Survival Toolkit • Kidsoft CD The Even More Incredible Machine and more!
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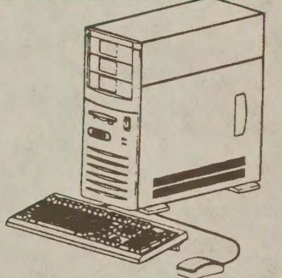

PRESARIO 920 CDS MULTIMEDIA MINI TOWER SYSTEM

486SX2-66MHz CPU • 420MB Hard Drive • 8MB RAM expandable to 100MB 1MB VRAM expandable to 2MB • 5 ISA expansion slots • Built-In Speakerphone 14,400 BPS Internal Fax/Modem • Dual-Speed CD-ROM • 16-Bit Sound Card WAV and MIDI Recorders • **Preinstalled Software:** MS DOS 6.2 • MS Windows 3.1 TabWorks • Quicken • Media Pilot Welcome Center • MS Encarta CD • MS Works CD
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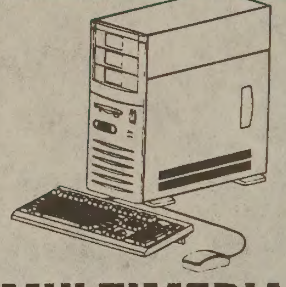

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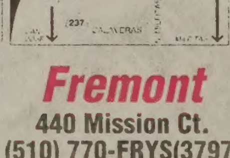

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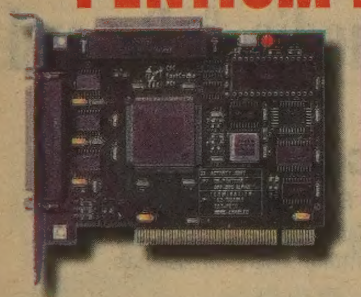

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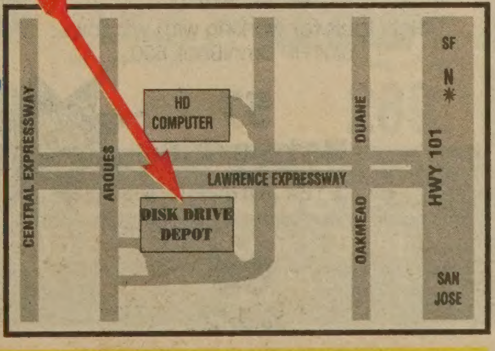

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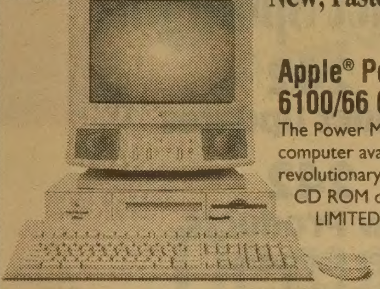

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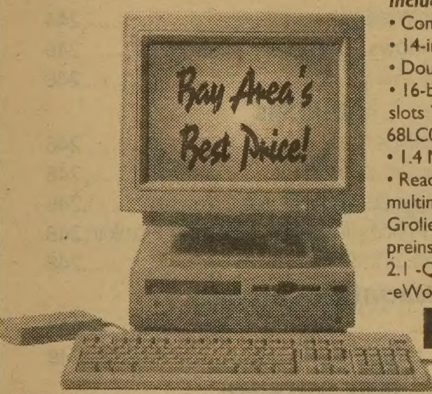

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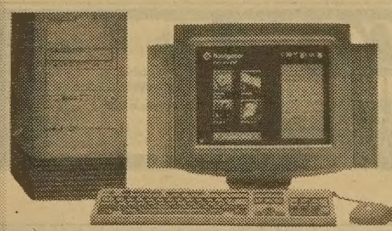

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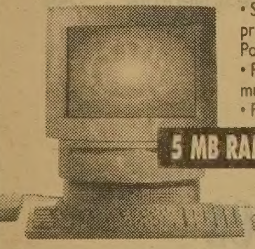

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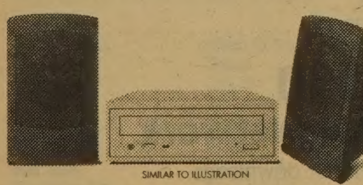

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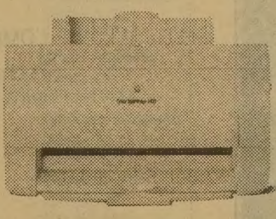

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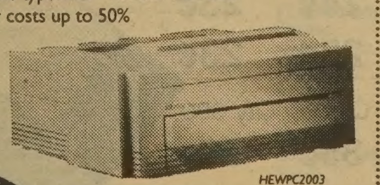

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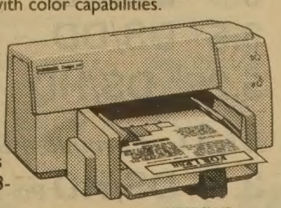

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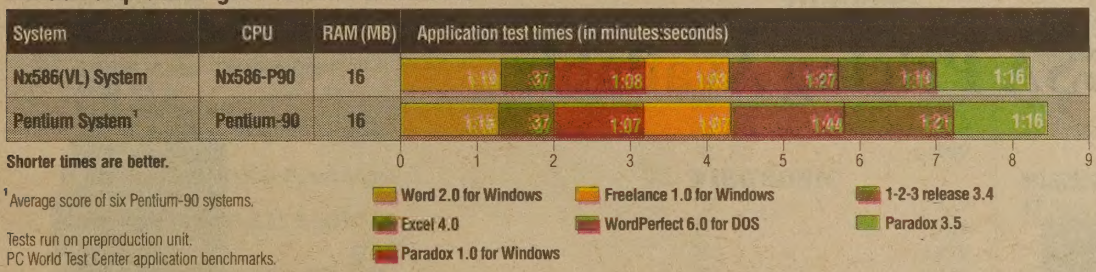

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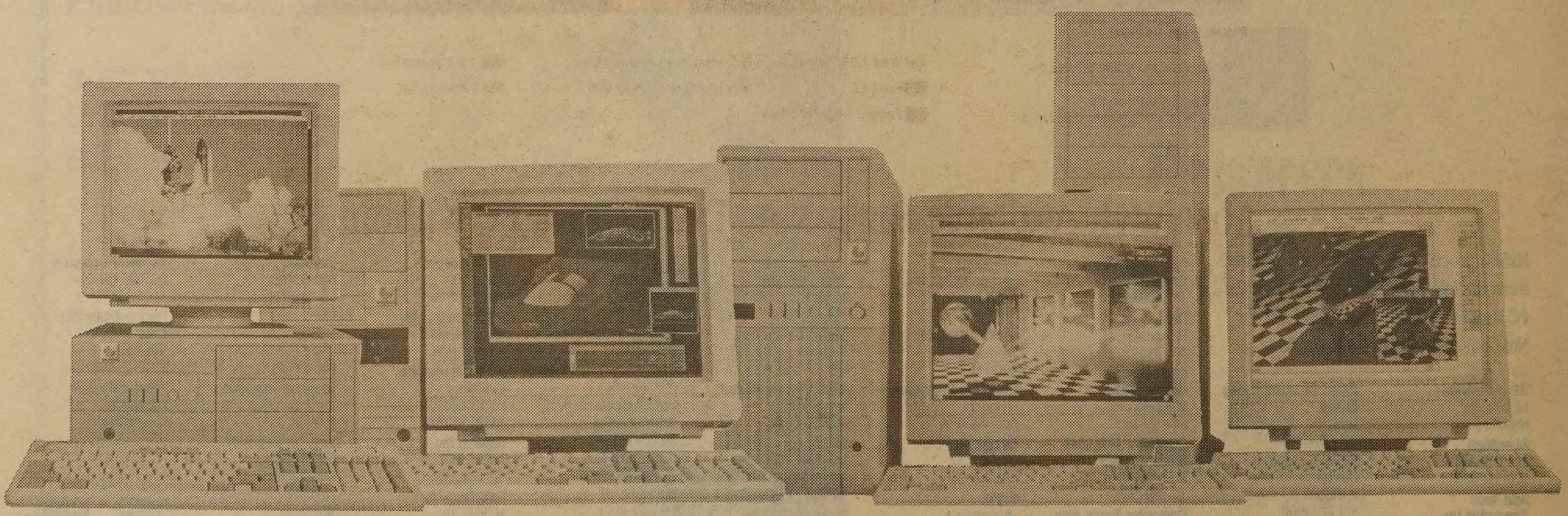

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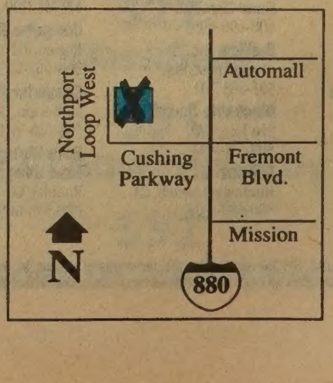
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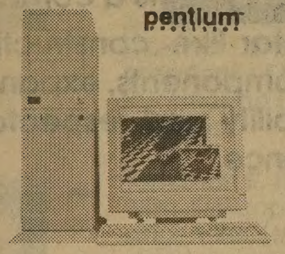

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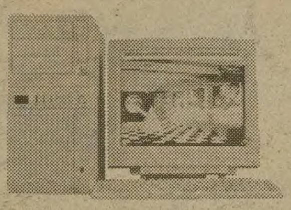

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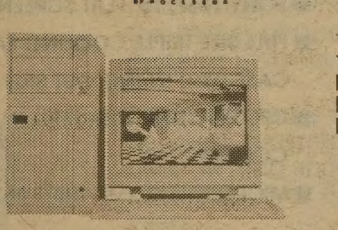

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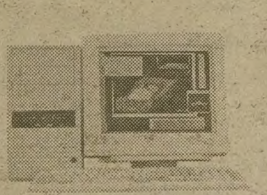

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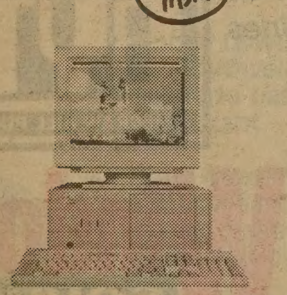

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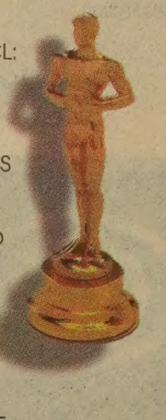

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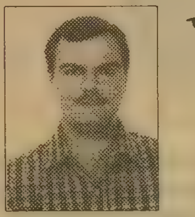

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He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), founded *InfoWorld*, was founding host of PBS' *Computer Chronicles* and founding editor of *Dr. Dobb's Journal*, and has chaired various computer and mathematics organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics and statistics. He began working as a programmer in 1968, and was a mathematics teacher and professor for ten years before that. He also serves on Autodesk's board of directors.

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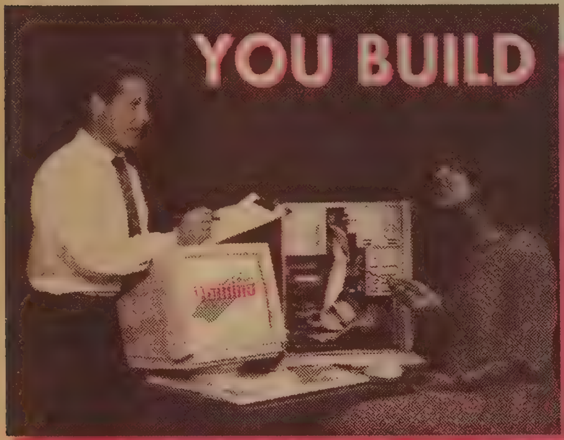

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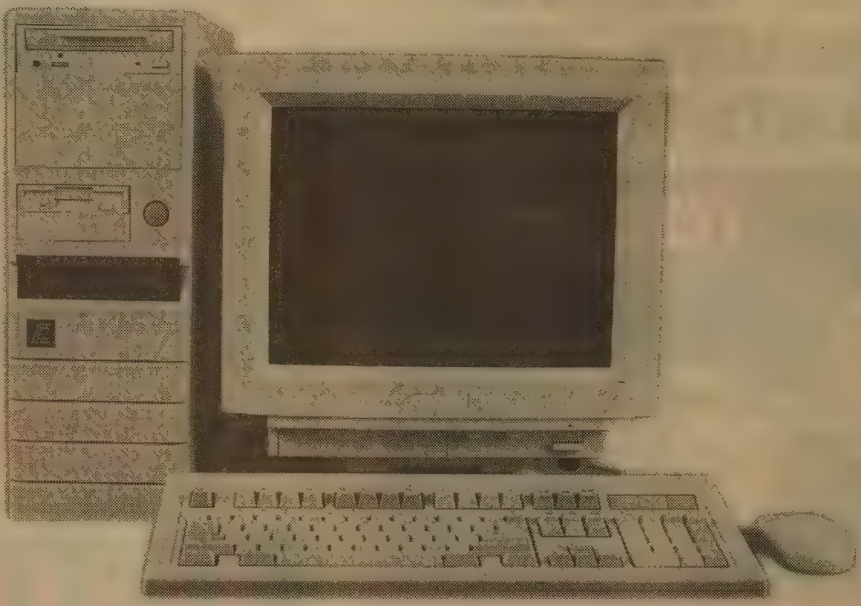

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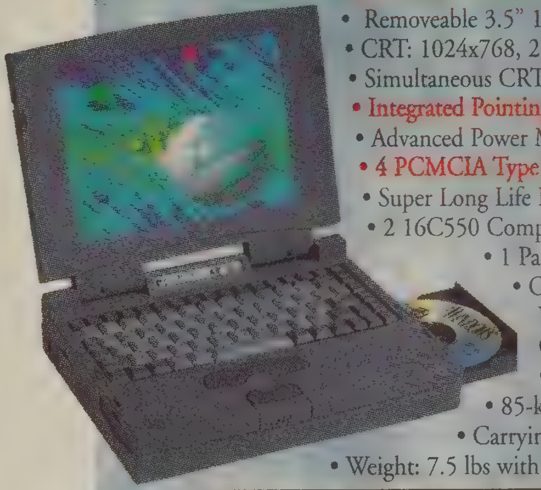

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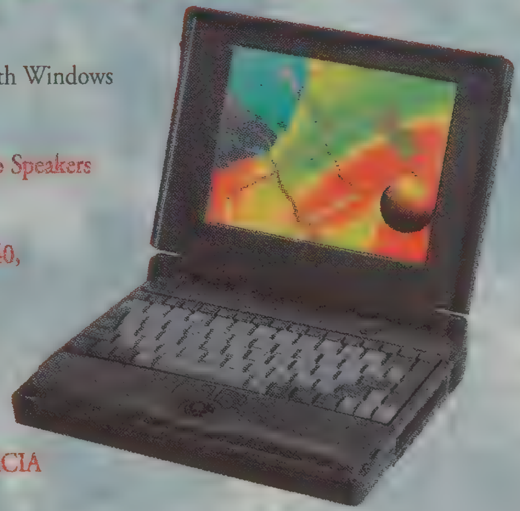

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BY PAUL HOFFMAN

Industry Insight

The Pentium Fiasco, Round II: Many Ways To Fix What's Barely Broken

More than a month after users demanded action about the well-publicized Pentium bug, Intel gave in and announced that it will replace the CPU chip for anyone who asks for it. In that time, the Pentium's reputation as the processor of choice was irrevocably damaged, and people who never thought twice about Intel's integrity now view the company as recalcitrant and dishonest.

However, the fact remains that the bug in the Pentium's floating-point unit was incredibly rare, unlikely to cause noticeable problems to more than a few people, and easy to fix in software. The bug became a nonissue: Intel's handling of this bug, previous ones, and future ones are all much more important than the bug itself.

Initially, Intel said that the bug would appear in only about one in nine billion calculations, and that even then the result would be correct in many decimal places. A few weeks later, IBM announced that its own research shows that the error was much more common, about one in one hundred million divisions. However, many people question IBM's analysis, since it is based on many unprovable assumptions, e.g. how frequently certain numbers appear in calculations, and what precision those calculations need.

The root of the problem was that Intel forgot to put some entries in a lookup table that controlled how the division was performed. The table of 2048 entries had five entries missing. These missing entries could cause the result of the calculation to shift a small amount, possibly becoming more or less wrong depending on the two numbers in the division. To fix the problem, Intel simply filled in those entries in the table and created new silicon for the Pentium. (The best technical description of the bug appears in the December 26 issue of *Microprocessor Report*.)

Intel has now agreed to replace all faulty Pentium CPUs with the fixed versions for the life of the processor. This replacement will not happen immediately, since Intel has only shipped enough "good" processors to replace a small fraction of the "bad" ones out there. Also, the replacement process might be painful, depending on the manufacturer of the computer the Pentium came in.

> **The bug became a non-issue:** Intel's handling of this bug, previous ones, and future ones are all much more important than the bug itself.

For example, if a PC has the Pentium in a standard socket, it is unlikely that an untrained person can remove it without damaging the motherboard. Many Pentium systems came with the CPUs in ZIF (zero insertion force) sockets that make replacing the CPU easy enough for an individual to do, but the process might still be difficult, depending on the CPU's position on the motherboard. If the Pentium is soldered or otherwise permanently attached to the motherboard, the entire motherboard has to be replaced; clearly, this has to be done by the manufacturer, not the end-user.

Intel has an additional headache: all Pentiums need some form of air cooling, and different manufacturers used different types of cooling systems. Many used custom heat sinks, and using a different heat sink might void a PC's warranty. Intel says all of these details will be worked out soon, but don't assume that you can just call Intel and have it mail you your new CPU. Intel is also making all customers give it a credit card number that will be charged if the old CPU is not sent back, thereby preventing a black market for the old CPUs.

In fact, unless you are sure you need the replacement because you need the high precision on divisions all the time, you should probably choose not to do the replacement at all. By the time Intel has the replacement program set up, all major software affected by the Pentium bug will have patches that circumvent the bug. Microsoft and Lotus already have patches for Excel and 1-2-3 available, as do many other software vendors. Applying these patches is incredibly less time-consuming, and probably much safer, than taking your PC into a service center for the CPU to be replaced.

Microsoft and other vendors of programming languages are also making patches available for their compilers. Any program compiled with the patched software will automatically detect possibly dangerous divisions and perform them in a safe fashion. In fact, Microsoft's compiler solution uses very fast tests and, even in cases where a possible error might occur, very fast changes are made to avoid the bug. Within a few months, the vast majority of software that might be materially affected by the bug should be fixed to avoid it.

The Pentium bug (Intel humorously insists on calling it a "flaw") is forcing people to look at one of the hard, cold facts of life with CPUs: they're full of software. The bug was not caused by an errant wire, a speck on silicon die, or a flaw in the manufacturing process. The cause is much more mundane: someone at Intel didn't copy the full table correctly, and they didn't test the chip well enough

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before committing it to silicon.

Software written by humans fails all the time. One major lesson from this episode is that you shouldn't rely on any software too much, even if it is in hardware. The people who started losing sleep over the Pentium bug should be mortified by all of the likely bugs in the software they use. Even if you write your own software, it must be compiled by other software before you can run it.

If you trust the folks writing the compilers more than you do the folks putting together Intel's CPUs, you might want to compare the age of the typical compiler coder at Microsoft (many of whom are fresh out of college) to the typical chip designer at Intel. If a mistake similar to the Pentium bug had been made in the library for a compiler, what is the chance that it would have been detected? Does any software company run as many tests on the output of their compilers as any of the CPU companies do on their hardware?

Regardless of how important the bug really was, or how easy it is to fix in software or in hardware, Intel clearly failed in its duty to its customers. Intel hid the bug until it became common knowledge. Worse yet, Intel still insists that it will not reveal whether there were any bugs that were silently fixed in previous revisions of the Pentium (or of any of its CPUs, for that matter), nor will it necessarily announce any new bugs that it finds. Thus, until Intel becomes more open and honest about bugs which are inevitable anyway, users will always suspect the results they get from any Intel CPU. Unfortunately, Intel's initial handling of the problem should make them all the more suspicious.

> **Software written by humans** fails all the time. One major lesson from this episode is that you shouldn't rely on any software too much, even if it is in hardware.

Macintosh Clones May Not Be What You Expected

Apple made two important announcements in December about other vendors being able to manufacture clones of the Macintosh computer. The real effect of the announcements won't be known for more than a year, but one thing is quite clear: Apple has finally heard the call to allow some cloning of the Macintosh.

The first announcement was probably of less interest to most Mac users, but may have a much larger effect on the long-term growth of the Macintosh market. Apple has created a new multimedia platform, called Pippin, based on the PowerPC CPU and a

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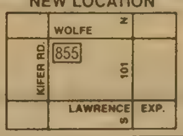

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EXCH	COMPANY	TICKER SYMBOL	CLOSING PRICE 12/16/94	CLOSING PRICE 01/18/95	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE										
OTC	Adobe	ADBE	33.50	32.31	-1.19	-3.54	129	0.20	0.62	38.50	21.50
OTC	Autodesk (H)	ACAD	38.25	37.50	-0.75	-1.96	29	0.24	0.64	41.50	21.88
OTC	Borland (L)	BORL	8.38	7.75	-0.63	-7.46	-	0.00	0.00	15.13	6.00
OTC	Informix (H)	IFMX	26.94	33.00	6.06	22.51	36	0.00	0.00	33.00	14.25
OTC	Lotus	LOTS	39.75	43.00	3.25	8.18	-	0.00	0.00	86.50	29.75
OTC	Microsoft	MSFT	63.38	65.06	1.69	2.66	33	0.00	0.00	65.13	39.00
OTC	Novell	NOVL	16.13	17.88	1.75	10.85	29	0.00	0.00	26.63	13.38
OTC	Oracle	ORCL	38.50	43.25	4.75	12.34	37	0.00	0.00	46.50	26.25
OTC	Software Publishing	SPCO	4.50	5.00	0.50	11.11	-	0.00	0.00	7.75	3.00
OTC	Symantec (H)	SYMC	17.88	20.38	2.50	13.99	120	0.00	0.00	20.38	9.88
	HARDWARE										
OTC	Apple (H)	AAPL	37.25	45.63	8.38	22.48	18	0.48	1.05	48.06	24.63
OTC	AST Research	ASTA	14.63	15.19	0.56	3.85	101	0.00	0.00	33.00	10.38
NYS	Compaq (H)	CPQ	38.63	43.38	4.75	12.30	15	0.00	0.00	44.38	26.75
NYS	Digital Equipment	DEC	34.75	36.75	2.00	5.76	-	0.00	0.00	37.50	18.25
OTC	Dell	DELL	38.38	46.88	8.50	22.15	20	0.00	0.00	47.38	19.13
NYS	Hewlett-Packard (H)	HWP	95.88	106.38	10.50	10.95	17	1.20	1.13	106.38	71.88
NYS	IBM (H)	IBM	70.13	77.25	7.13	10.16	22	1.00	1.29	77.25	51.38
NYS	Silicon Graphics	SGI	29.63	32.75	3.13	10.55	32	0.00	0.00	33.13	18.75
OTC	Sun Microsystems (H)	SUNW	34.13	34.63	0.50	1.47	15	0.00	0.00	37.63	18.25
NYS	Xerox	XRX	97.25	104.13	6.88	7.07	17	3.00	2.88	112.75	90.63
NYS	Tandy (H)	TAN	46.75	50.25	3.50	7.49	20	0.72	1.43	52.38	30.75
	CPU'S										
NYS	Advanced Micro Devices (H)	AMD	23.13	32.13	9.00	38.92	9	0.00	0.00	32.13	18.50
OTC	Intel	INTC	59.50	69.38	9.88	16.60	13	0.24	0.35	73.50	56.00
NYS	LSI Logic	LSI	41.63	43.25	1.63	3.90	26	0.00	0.00	45.38	16.75
NYS	Motorola (H)	MOT	56.25	62.50	6.25	11.11	24	0.40	0.64	63.00	42.13
	COMMUNICATIONS										
NYS	AT&T	T	51.63	49.00	-2.63	-5.08	16	1.32	2.69	57.13	47.25
NYS	BellSouth Corp.	BLS	53.88	54.88	1.00	1.86	20	2.76	5.03	63.50	50.50
OTC	MCI	MCIC	18.25	18.94	0.69	3.77	15	0.10	0.53	28.38	17.25
NYS	Northern Telecom	NT	32.75	34.00	1.25	3.82	30	0.36	1.06	37.75	26.00
NYS	Pacific Telesis (L)	PAC	29.13	29.25	0.13	0.43	27	2.18	7.45	33.75	28.00

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	26
DECLINES	4
UNCHANGED	0
NEW HIGHS	11
NEW LOWS	2

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	Hewlett-Packard	$	10.50
LARGEST DOLLAR LOSER	AT&T	$	-2.63
LARGEST PERCENTAGE GAINER	Advanced Micro Devices		38.92 %
LARGEST PERCENTAGE LOSER	Borland		-7.46 %

	CLOSE 12/16/94	CLOSE 01/18/95	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD
MICROTIMES STOCK INDEX	5370.37	5832.57	462.20	8.61
DOW JONES INDUSTRIAL AVERAGE	3807.19	3928.98	121.79	3.20
STANDARD & POOR'S 500 INDEX	458.80	469.72	10.92	2.38
N.Y.S.E. COMPOSITE	250.54	255.97	5.43	2.17
NASDAQ COMPOSITE	729.07	772.38	43.31	5.94

CLOSING QUOTES FOR GRAPH:

DATE	MICRO TIMES	DOW JONES
05/27/94	4709.29	3757.14
06/24/94	4238.94	3636.94
07/22/94	4577.29	3735.04
08/19/94	5070.19	3755.11
09/16/94	5323.66	3933.35
10/27/94	5478.47	3875.15
12/16/94	5370.37	3807.19
01/18/95	5832.57	3928.98

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Investors, choosing to focus on the positive effects of economic growth vis-á-vis higher interest rates which usually accompany such growth, bid technology stocks sharply higher to start the new year. When the books were closed on the entire monthly trading session, here is how our basket of high-tech stocks fared: The MicroTimes Stock Index swelled 462.20 points, or 8.61%, en route to a close of 5832.57. Of the stocks that make up our indicator, advancing issues towered over declining issues by nearly a 7-to-1 ratio, with eleven of the stocks hitting new 52-week highs vis-á-vis two stocks that fell to new lows.

In comparison, the Dow Jones Industrial Average plowed through the 3900 level to close above that mark for the first time since October, 1993. In fact, the Dow Jones Industrial Average jumped 121.79 points, or 3.2% last month before coming to rest at 3928.98.

Chip makers continued to ride their popularity wave during the last thirty days and no stock climbed higher last month than Advanced Micro Devices. The reasons: The company settled all legal disputes with rival Intel, the company's current strong momentum should carry over into 1995 due to strong demand for personal computers, and improved availability of AM486 microprocessors among other things. The result: AMD's stock price rocketed $9 a share, or 38.9%, en route to a new 52-week high of $32.13.

Intel, with its Pentium processor problems seemingly behind it, also rallied robustly last month. Specifically, Intel's share price leapt $9.88 a share, or 16.6%, to conclude matters at $69.38.

Dell Computer also rewarded its shareholders handsomely last month, as it rose $8.50 a share (22.2%) to $46.88. The stock rallied strongly after Intel said it would replace its Pentium chips to Dell's customers free of charge. Also last month, Dell completed the conversion of its Pentium-based OptiPlex product line to Intel's updated Pentium processor. ■

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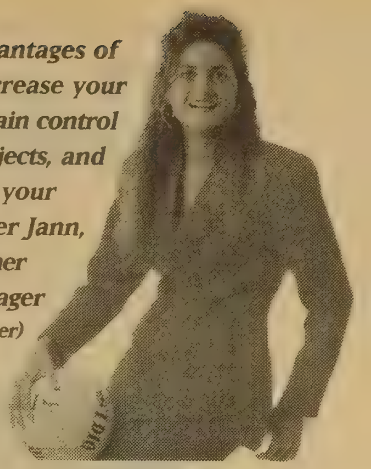

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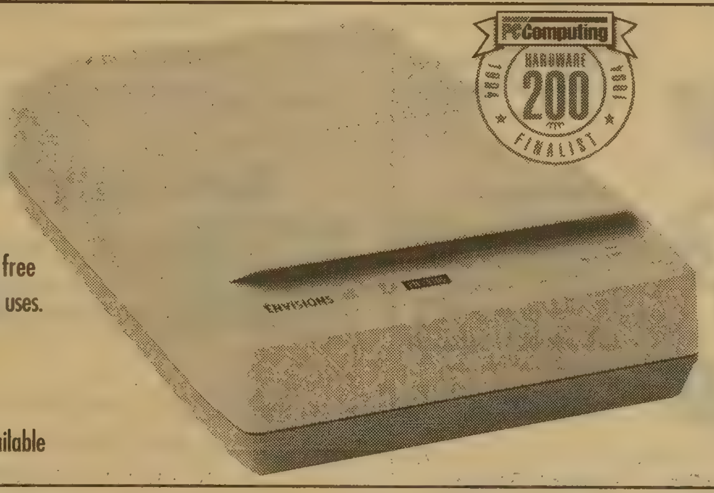

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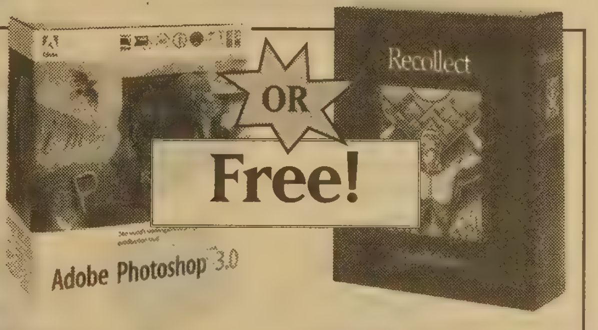

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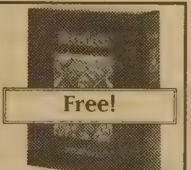

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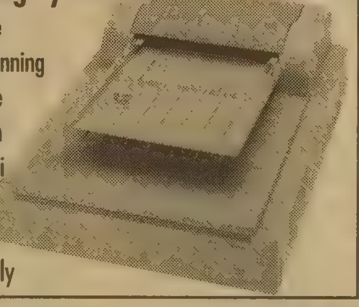

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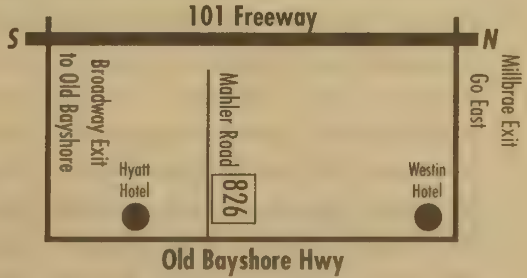

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high-speed CD-ROM drive. Basically, Pippin is a Mac clone without the keyboard, monitor, or floppy drive. It is meant to run educational and game software on a television set, although it can display on current computer monitors as well.

What's a computer without a keyboard? Ask the tens of millions of Nintendo and Sega users. Apple realized that most CD-ROM software didn't require a keyboard at all, and it didn't need the high resolution of a computer monitor. Cutting out the high-price items of the system allowed Apple to create the Pippin specification, which will allow manufacturers to create systems that cost under $500 and are competitive with the high end of the home game market.

Pippin will be much more than a game machine, however. Apple designed Pippin's system software to be so much like the current Macintosh's that most of today's Mac CD-ROM titles can be converted to Pippin in less than a week. Further, future software that is Pippin-compatible will be Mac-compatible, meaning that most of the new Mac CD-ROMs will run the same on both systems. Bandai, a large second-tier game manufacturer in Japan, has already announced that they will have a Pippin system ready by the end of this year.

Basically, Pippin is a Mac clone without the keyboard, monitor, or floppy drive.

Of course, this is merely what Apple says will be the case, and it could easily be wrong. Apple has a poor track record of having its new system software predictions be accurate, particularly when it comes to glowing descriptions of the ease of porting from one system to another. On the other hand, Apple got the respect of many of its Macintosh developers by making the transition to PowerPC Macintoshes almost transparent to users of nearly all of the current 68000-based software. Until the Pippin hardware platform is widely distributed, many CD-ROM software manufacturers remain skeptical, and even fearful that they will have to support two similar but visually different platforms off of the same disk.

The other licensing announcement was that Apple has made deals with at least one US manufacturer allowing them to make clones of PowerPC Macintoshes. Although this got more press coverage than Pippin, it seems unlikely that these clones could be priced competitively enough against Apple's offerings to make them too attractive to people who have completely linked the names "Apple" and "Macintosh" in their minds. The first US licensee is a startup company with no track record, which is not a good sign.

One of the likely early clone makers will be Radius, which will probably create high-end graphics workstations using its video technology. Such a system might be price-competitive with a similar Apple system, but this is a small niche market. If someone is about to shell out over $7000 for a high-end system, they are not likely to give the money to a company with a reputation for abandoning whole product lines and stranding customers; Radius will have to overcome its reputation for poor technical support, particularly in its online forums. ■

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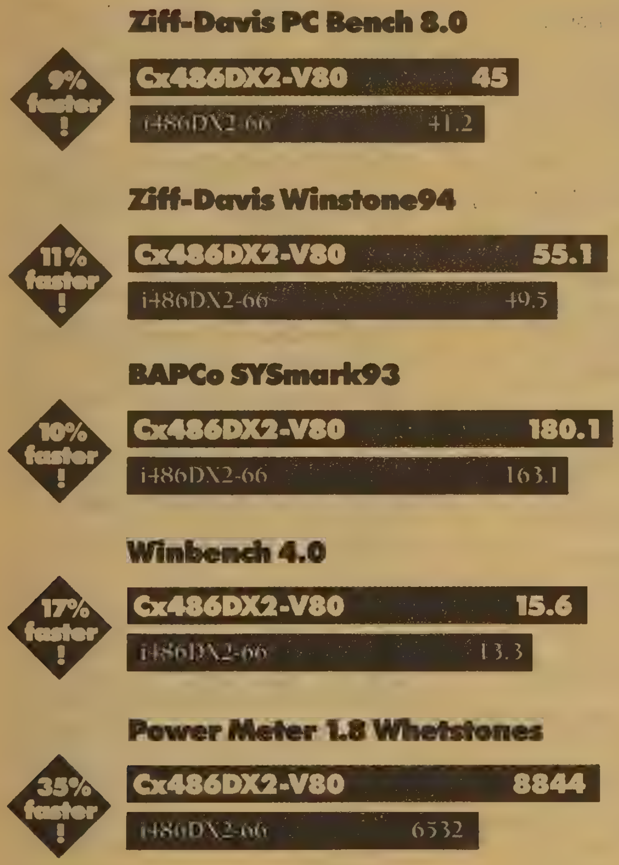

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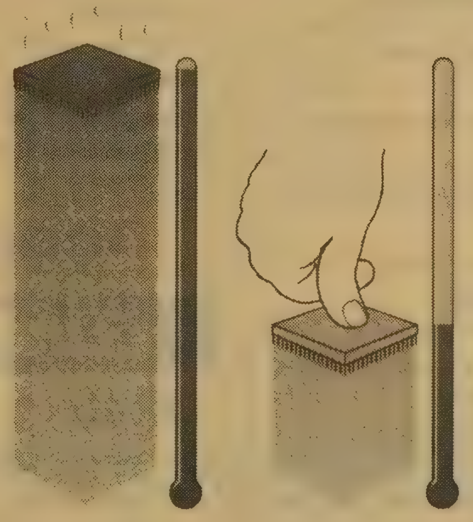

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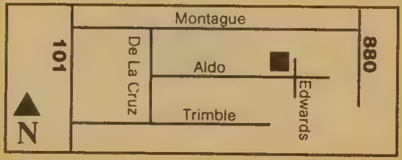

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REALIZABLE FANTASIES • BY JIM WARREN

NewtNet And The Revolution Of '96

Okay, now that the elections are over, we better get to work. (You didn't really think that all we citizens needed to do was vote, did you? You don't really want to leave our governance and future up to those in Washington—without citizen guidance and oversight—do you?)

The Future Is Like The Past, Only Different

What if...

•It's not *1994*; it's *1894* And some o' them young whipper-snappers are runnin' 'round town in them thar new-fangled gas-buggy thingies. They're dangerous, hard to steer; they break down, scare the horses, and they're much too complicated for the little lady of the house to use. They'll never last.

Nonetheless, within just a decade or two—along with all the other automobile-wrought irrevocable societal changes—it became essentially impossible to conduct effective political action without using this new technology.

But some folks can't afford it, and others can't learn how to use it.

•In the late '40s, television spread across the land—for better and worse.

By 1960, Jack Kennedy used it—plus some Richard Daly ballot stuffings in Chicago—to squeak by Richard Nixon in the presidential race. Kennedy and his advisors used that era's new image-transportation system for political gain—as did a second-rate horse actor, twenty years later, and as did a "Texan with a bad haircut" who helped depose an incumbent president in 1992.

Within less than two decades, a new technology irrevocably changed how effective political action is conducted. (And it's now almost impossible for a homely or ugly person to get elected. Lincoln would lose. Ahh, but I digress.)

But TV's *really* expensive.

•Around the '70s, Richard Vigurie put together a then-sophisticated computerized system for identifying, tracking, and hustling potential small contributors to conservative causes. Using it, he generated massive cash-flow into conservatives' political campaigns—especially given federal matching funds for small contributions—and made personal millions from campaign-consultant fees in the process.

Again, new technology irrevocably changed the political landscape.

As it was in the past, so shall it be in the future—almost. *Except* for the cost!

This time, the new political technology is *cheaper, faster,* and *easier* than those preceding political tools. For the first time in centuries, effective political action is again economically available to anyone. Just like *any* effective political action, it takes time and effort—but it otherwise costs almost nothing at all!

Although the mass media didn't publicize it until after the elections, Gingrich has been urging for some time that coyly cloistered Congress open itself to Net-aided citizen oversight.

I'm talkin' about Net-based, computer-aided grassroots political action. In 1996, there will be federal and state elections that are won or lost depending on how well or poorly their candidates learn to use it.

Irresistible Political Tools

The first prerequisite for effective political action—by experienced political hacks, big-bucks lobbyists, or grassroots activists—is timely access to information on which to base informed actions.

The second prerequisite is the ability to communicate with the body politic—previously available only to those who could afford newsprint by the ton and broadcast airtime for the wealthy.

Politicians don't suck up to big-bucks special interests because they want the bucks; they grovel before the big bankrolls because they need 'em to fund their ability to communicate (propagandize) to their electorate!

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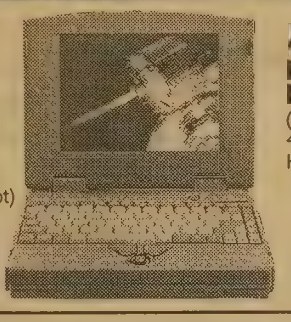

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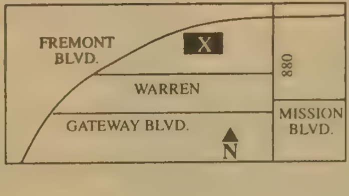

the population,

(d) it provides a *potent* tool for *coordinating* local, *offline* grassroots action to reach the full electorate, and

(e) most importantly—its access and empowerment make it economically available to almost anyone (and it's far easier, cheaper, and faster to learn to "drive" the information roadways than it is to learn to drive the vehicular roadways).

NewtNet And An Informed Electorate

Concerning the first prerequisite—timely access to essential information:

Most of my progressive friends (previously called "liberals") are horrified at the specter of the Republicans in general—and House Speaker Newt Gingrich (*georgia6@hr.house.gov*) in particular—taking control of Congress.

I feel differently.

I'm willing to give 'em six months—or even most of this nonelection year—to recognizably begin to improve on what the Democrats have done in the past two generations. (If you didn't like Reagan's monumental deficit or his taxbreaksfortherich, remember: The president could only spend money and reduce taxes, *as authorized by the then-Democratic Congress.*)

Although the mass media didn't publicize it until after the elections, Gingrich has been urging for some time that coyly cloistered Congress open itself to Net-aided citizen oversight.

Already often called "NewtNet," Gingrich has committed to making House legislative information available via the computer nets as soon as it's available to legislators and their lobbyists. With luck, he will also drag along his elite, unreachable Senate elders, entrenched in their private baronies.

But Do They Know What They're Doing?

I am convinced—so far—that Gingrich is dedicated to opening up congressional information to timely Net-based access. In theory.

However, I wonder about some of the indications I have received—and failed to receive—from Gingrich's staff and the House Republican's automation team regarding their plans, if any, for implementing such public access. After all, it is being designed in Washington—always cause for public concern.

To NewtMan, et al.

So this column is actually for Gingrich—and for Senate Leader Bob Dole and the rest of our Congress-critters. If you generally agree with what follows—send copies to Newt and Dole, and Senators Dianne Feinstein and Barbara Boxer, and to your own representative, with a note saying, more or less, "Do this, *NOW!*"

Note: This want-list and reader-action proposal is appearing, here in *MicroTimes*

NOW THEY TELL US!

On December 9, I faxed a request for information about Gingrich's proposed online access to House information to his press secretary, noting that I was preparing columns about this for several large-circulation periodicals. Response to date? Zip!

Not quite the timely access that Newt's proposed—although they were undoubtedly swamped.

January 4th was our deadline for this column; I transmitted it that afternoon.

It was also the opening day of Congress, when they passed history-making reforms in the rules that govern how the House does business. (Would that the Senate could do the same.) One rule they passed that night may directly affect Net-surfers, depending on how it is implemented:

They mandated that, for the first time, the *Congressional Record* would have to *accurately* report House members' *actual* comments; they revoked Congress-critters' traditional freedom to "revise" the official record.

They retained their right to "extend" their remarks—justified to allow inclusion of additional information that can't be presented in time-limited spoken comments. And they required that such "extensions" be in a "distinctive typeface," to clearly differentiate members' actual comments from their unspoken, after-the-fact extensions.

But those poor ol' print-oriented House leaders forgot that in "modern" online communications, monofont ASCII is the only "font" that is most-universally available (okay, so ASCII is *semi*-modern).

Call, fax, or write the House Administration Committee, and urge them to adopt implementing rules that will make those after-the-fact extensions clearly distinct from actual spoken comments in the *online* copies of the *Congressional Record.*

And a day later, the Librarian of Congress, James Billington, announced that congressional information was now globally available via their new system named THOMAS—as in Thomas Jefferson. It will include at least some, but almost certainly not all, of what this column has recommended—including the *Congressional Record*. Details in future columns.

Things do seem to be moving a bit faster in Congress than under the previous leadership.

—Jim Warren

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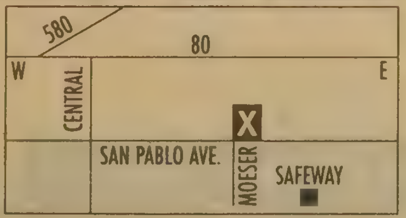

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- All unclassified minutes and transcripts;
- Complete records of all motions made and votes taken (including those outrageous "voice votes" that permit House members to avoid being on the record *re* crucial decisions, e.g. last October's half-billion-dollar appropriation for the National Wiretap System *sans* independent oversight);
- The *Congressional Record* (even though it is wildly fictitious since legislators often "revise and extend" their actual remarks before publication as the official record);
- Transcripts of all House and Senate C-Span programs (which are *accurate, even though they cover only a very limited portion of* hearings and events);
- Position statements by legislators (except those issued within, say, six months before any federal primary or general election);
- Abstracts, summaries, topic indices, and cross-references for all legislative information;
- All reports by the Congressional Research Service (CRS);
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ommendations);

- Case law (precedents set by courts, interpreting the meanings of laws that are often left intentionally ambiguous by Congressvolks with inadequate backbones; judicial-branch records, but nonetheless essential for understanding government);
- Legislators' Washington and district-office phone and fax numbers, and snail-mail and electronic-mail addresses (those hiding their Washington fax numbers—except, of course, from donors and "important" people—aren't *our* representatives);
- Same information for legislative staff, plus descriptions of their areas of expertise and current assignments—easily updated when it's online (related professional *vitae* would also help);
- Names and addresses of all registered lobbyists and their disclosed clients, legislative interests, fees received, and "contributions" channeled;
- *Timely* and *complete* campaign-finance disclosures and financial-interest statements (already available online from the FEC—Federal Elections Commission—but only for a fee and after some rekeying delay; significant disclosures should be required to be submitted to the FEC in computerized form in the first place);
- Legislators' interest areas and personal backgrounds;
- Descriptions and tutorials about each committee and its jurisdiction;
- Overview of how Congress works in principle; and
- Practical tutorials about how Congress *really* functions, as would be needed by new legislators and lobbyists

—among other things. Anything less *ain't* adequate public access.

This must be available in standard, nonproprietary forms—computer text, publication-quality text, financial spreadsheets, database datafiles, graphs, photos, motion video, satellite images, maps, etc.—or include freeware to handle nonstandard formats.

Anything less—or less timely—is merely inadequate pretense of public access.

And of course, we want it all *now*.

* "Free" (Tax Prepaid)

This information already exists, often already computerized—at taxpayer expense for government use.

The cost per item, per computer-using-citizen, of making it available via the public computer nets is nano-pennies—much less than it would cost to bill for and collect at-cost user fees.

Furthermore, it is essential for an informed public, and any fees would deter citizen access.

Thus, access should be without government fees.

Additionally, such public information should be declared to be in the public domain, permitting unlimited copying, redistribution, and reuse by citizens, nonprofit groups, and for-profit users. This mirrors the executive-branch policy, declared in June 1993 in the Office of Management and Budget's Circular A-130.

This encourages public-service groups and tax-generating entrepreneurs to add value, creating additional analyses, cross-references, indices, printed copies, faxed summaries, automated notifications, and so on—things that government agencies couldn't do and shouldn't do.

Newt talks the talk. Will he walk the walk? ■

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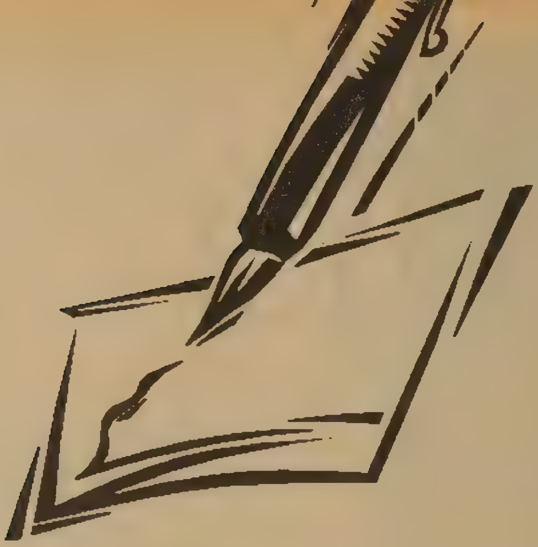

Letters

Junk Bonds: Another View

In his article "IQ and PCs" (Jan. 2, 1995), Rich Karlgaard says that junk bonds "produced $800 billion in wealth."

Wealth is created only when we produce larger quantities of goods or services (or produce the same quantity with fewer resources or less pollution). When a stock increases in price, no wealth has been created; it's a pure transfer payment.

Wealth is created through the stock market only when money is invested in greater (or more efficient) production. If I loan money to a company and they use that money to increase production, that's wealth creation. But if I sell that stock to you at twice the price I bought it for, that's not wealth creation; it's not even investment (the company doesn't get any money and therefore does not increase investment); it's pure gambling.

Although Milken claimed that the high debts and takeover threats that accompanied the junk-bond binge were forcing producers to be more efficient and thus were increasing wealth, in many cases he and his cohorts in crime merely sold off existing assets, pocketed the money, and let the hollowed-out shell of a corporation go bankrupt. That is not wealth creation; it was just wealth transfer (of the kind that conservatives abhor when it's used to take money from the rich and give it to the poor).

Mark Gilkey
Palo Alto

The Freep: A Correction

I enjoyed Robert Moskowitz's article on the *San Francisco Free Press* and the Gate, but I would like to clear up one inaccuracy.

Chris Gulker did not train any of the *SF Free Press* editors. As director of technology, Gulker simply provided some instruction material after being pressed by an editor and reporter who wanted to learn more about the World Wide Web.

Bruce Koon
Associate Editor
San Francisco Examiner

MegaTimes?

In the middle of reading your excellent January 2nd 1995 edition, it occurred to me that you are mis-yclept "MicroTimes."

Rather than just complaining, I'd like to offer a few better names. My personal favorite is "MacroTimes," 'though "MegaTimes" or "SundayNewYorkTimes" might be acceptable alternatives.

Fortunately, you don't waste the surfeit of advertising and editorial space. I enjoy each of your issues, and, although I am a Macintosh user, find enough wheat among the PC chaff to make it worthwhile.

Seth Haber
via Internet

Hm.
—*eds.*

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Area Code Fax Number

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E-mail address (continued)

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○ MACINTOSH NOTEBOOK

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○ Compatibles
○ No Preference

Step 1: Enter PC System Brand Name & Model #. If Preference

Step 1: Enter NoteBook Brand Name & Model #. If Preference

Quantity / Choices
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ 10 or More ○

My Budget For System Is ○ Under $1000 ○ $1000 to $1999 ○ $2000 to $2999 ○ $3000 to $3999 ○ $4000 to $4999 ○ Over $5000

Call Me For A More Detailed Quote. ○ Quote Me For Selected Upgrade/Peripherals Choices Only. ○

STEP TWO: CONFIGURATION REQUESTS: CPU ○ PENTIUM ○ 486 ○ 386 ○ MAC QUADRA/PERFORMA ○ MACPOWER PC

CPU MHz SPEED:
○ DX4 ○ DX2 ○ DX ○ SX ○ SLC ○ Quadra ○ PowerPC
○ 100 ○ 90 ○ 80 ○ 75 ○ 66 ○ 60 ○ 50 ○ 40 ○ 33 ○ 25

BUS TYPE ○ PCI ○ VLB ○ EISA ○ ISA

CACHE ○ 64K ○ 128K ○ 256K ○ 512K

RAM: ○ 1MB ○ 2MB ○ 4MB ○ 8MB ○ 16MB ○ 32MB ○ 64MB ○ 128MB

HARD DISK DRIVE: ○ 100MB+ ○ 300MB+ ○ 500MB+ ○ 1GB+ ○ 4GB+
○ IDE ○ SCSI ○ 200MB+ ○ 400MB+ ○ 700MB+ ○ 2GB+ ○ 8GB+

MONITOR: ○ SVGA ○ VGA ○ MONO ○ 26 DPI
○ 14" ○ 15" ○ 17" ○ Non Interlace ○ 28 DPI
○ 20" ○ 21" ○ Multisync

FLOPPY DRIVE: ○ 1.44MB
and/or ○ 1.2MB

FAX MODEM: ○ Internal ○ External
○ 9600bps ○ 14400bps ○ 28800bps

CASE TYPE: ○ Mid Tower
○ Desktop ○ Full Tower

VIDEO CARD RAM ○ 512KB
○ 1MB ○ 2MB ○ 3MB ○ 4MB

POINTING INPUT DEVICES: ○ Any Mouse ○ MS Mouse ○ Keyboard
○ Serial ○ Bus ○ PS2 ○ Trackball ○ Joystick ○ Ball Point ○ Pen

OPERATING SOFTWARES NEEDED: ○ DOS ○ OS2
○ Mac ○ UNIX ○ MS Windows

STEP THREE: MULTIMEDIA UPGRADE ○ Please Add To Step 1 & 2 Quotation ○ Please Quote Me Separately

CD ROM DRIVE: ○ Internal
○ IDE ○ SCSI ○ External

SPEED ○ 2X ○ 3X ○ 4X

CD ROM TITLES INCLUDED:
○ 1-5 ○ 5-10 ○ 11+

○ BRAND NAME ○ No Brand Name Preference

CD ROM Brand Name and Model Number

SOUND CARD ○ 16Bit ○ 32Bit

SPEAKERS
○ Less Than 25W
○ 25 to 50W
○ 50 to 75W
○ More Than 75W

STEP FOUR: NOTEBOOK SECTION - Please Note You Must Make Choices In Steps 1 & 2 To Complete Step 4

SCREEN TYPE: ○ Mono
○ Dual Scan Color ○ Active Color

PCMCIA SLOT: ○ Type I
○ Type II ○ Type III ○ Type IV

○ Audio Capable ○ Docking Station
○ Fax Modem ○ Extra Battery

STEP FIVE: NETWORKING NEEDS: ○ Please Contact Me on My Networking Needs Indicated Below
○ Software ○ Hardware ○ Consultation ○ Design ○ Installation ○ Administration ○ MS Workgroups
○ Users 2 to 10 ○ Users 10 to 50 ○ Users Over 50 ○ Lantastic ○ Apple Talk ○ Novell ○ MS NT

STEP SIX: UPGRADES and PERIPHERALS. ○ Ink Jet Printer ○ Tape Backup ○ Accelerator
○ Color Printer ○ Dot Matrix Printer ○ Laser Printer ○ Flat Bed Scanner ○ Digitizer ○ Hand Scanner

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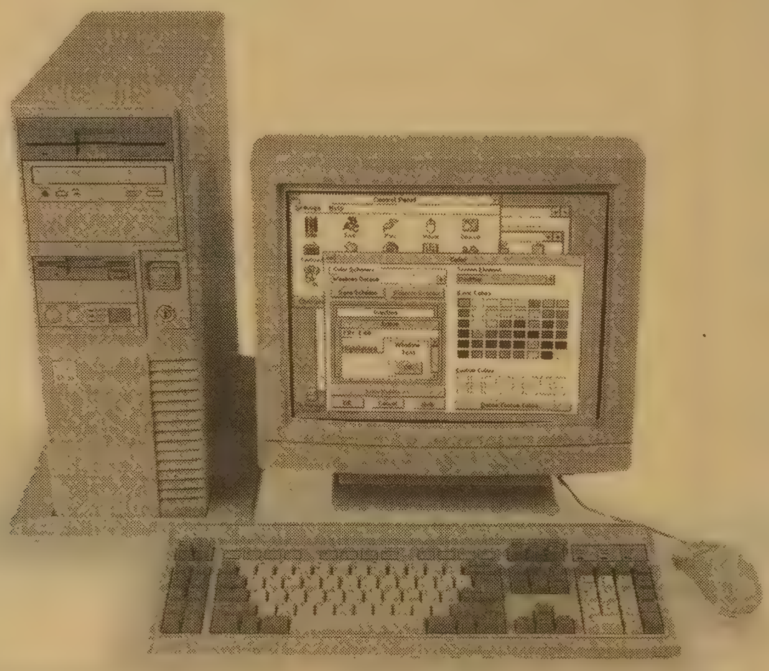

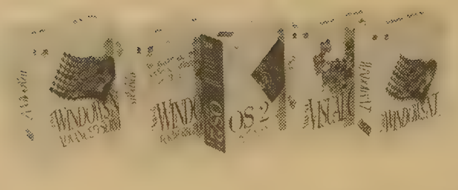

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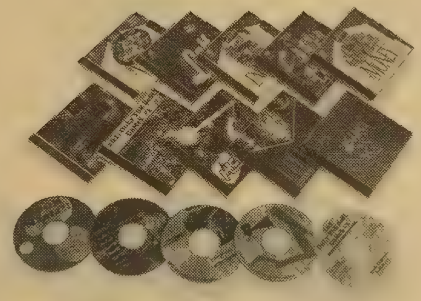

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- Microsoft Serial Mouse
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- 1 Parallel Port
- 16 Bit Sound Card & Stereo Speakers
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- 101-key Keytronic Keyboard
- Microsoft Serial Mouse
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- Microsoft Money
- Microsoft Works
- Microsoft Entertainment Pack
- Microsoft DOS 6.22 & Windows 3.11
- Free Mouse Pad
- Free America Online

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- **8MB 72-pin RAM (max. 128MB)**
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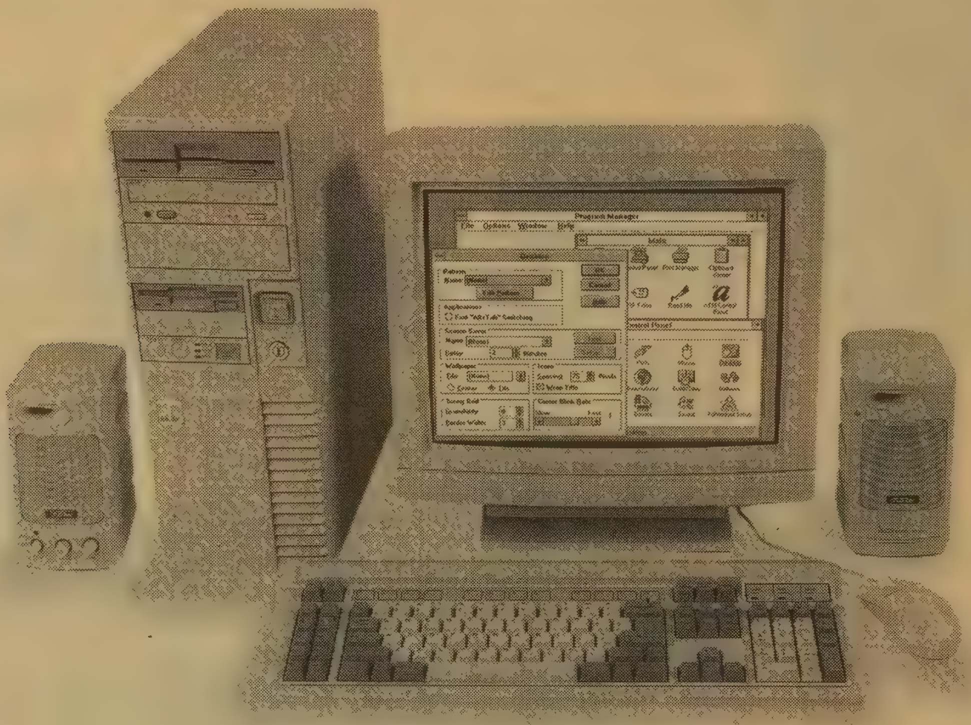

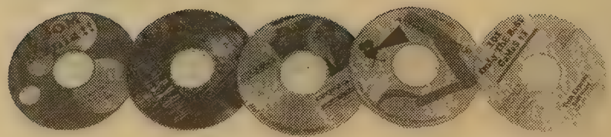

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- 3 Button Serial Mouse
- Microsoft Encarta 95'
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- Microsoft Entertainment Pack
- Microsoft DOS 6.22 & Windows 3.11
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- Free America Online

$2095

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- **Intel Pentium 60MHz Processor**
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- **Diamond Stealth 64 PCI/2MB**
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- **Double Speed Internal CD-ROM Drive**
- **Sound Blaster 16 Sound Card**
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- NCR PCI SCSI-II Controller
- 2-16550 High Speed Serial Ports
- 1 Parallel Port
- Mid Tower Case w/250W Power Supply
- 101-key Keytronic Keyboard
- Microsoft Serial Mouse
- Microsoft Office Professional 4.3
- Microsoft DOS 6.22 & Windows 3.11
- Free Mouse Pad
- Free America Online

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SILVER
PENTIUM Processor

- **Intel Pentium 90MHz Processor**
- **512K Cache**
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- **15" Digital Flat Screen NI Monitor .28 dpi**
- **Quad Speed Internal CD-ROM Drive**
- **16 Bit Sound Card Stereo Speakers**
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- PCI Enhanced IDE Controller
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- Microsoft Serial Mouse
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PENTIUM Processor

- **Intel Pentium 90MHz Processor**
- **512K Cache**
- **16MB 72-pin RAM (max. 128MB)**
- **1GB Enhanced IDE HDD**
- **ATI Graphics Pro Turbo PCI Video Card w/2MB Vram**
- **17" Impression 1280x1024 Non-interlaced Flat Screen Monitor**
- **Double Speed Internal CD-ROM Drive**
- **Sound Blaster 16 Sound Card**
- 1.44MB FDD
- PCI Enhanced IDE Controller
- 2-16550 UART High Speed Serial Ports
- 1 Parallel Port
- Mid Tower Case w/250W Power Supply
- Microsoft Serial Mouse
- 80 Watt Shielded Speakers
- Microsoft Office Professional 4.3
- Microsoft DOS 6.22& Windows 3.11
- Free Mouse Pad
- Free America Online

$3895

Victoria™ Series

486PCI/VESA LOCAL BUS

Visual C++
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Windows NT Advanced Server
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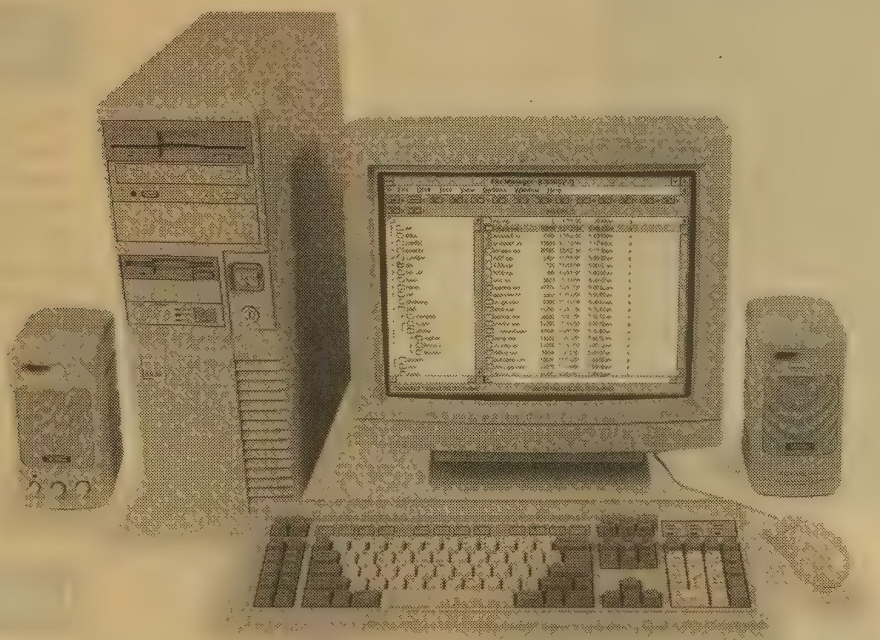

VIOLET

VESA Local Bus Best Buy

- **Intel 486 Processor**
- **424MB IDE HDD**
- **15" Non-Interlaced Monitor, .28 dpi**
- 128KB Cache
- 4MB RAM
- 1.44MB FDD
- VLB 2H/2F IDE Controller
- 2S, 1P, 1G Ports
- 32Bit VL-B Graphic Accelerator Card/1MB
- Mini Tower Case w/ 250W Power Supply
- 101-key Enhanced Keyboard
- 3 Button Serial Mouse
- Microsoft DOS 6.22 & Windows 3.11
- Free Mouse Pad
- Free America Online

Microsoft Upgrade Kit

- **Double Speed CD-ROM Drive**
- **Sound Blaster 16 Bit Sound Card**
- Amplified Stereo Speaker
- Microsoft Encarta Encyclopedia
- Microsoft Golf
- Microsoft Works
- Microsoft Money
- Microsoft Entertainment Pack
- Danger Creative
- Sim City 2000
- Scene

SX-33	*$1455*
DX-33	*$1535*
DX2-50	*$1555*
DX2-66	*$1595*

BROWN

486 PCI Office System

- **Intel DX-486 Processor**
- **8MB 72-pin RAM (max. 128MB)**
- **730MB IDE Hard Drive**
- **Diamond Stealth 64 PCI/1MB**
- **15" Digital Flat Screen Monitor**
- **Double Speed CD-ROM**
- **Sound Blaster 16 Sound Card**
- ZIF Socket for Upgrade to Pentium OverDrive
- 256K Cache
- 1.44MB FDD
- Built-in PCI IDE Controller
- 2-16550 High Speed Serial Ports
- 1 Parallel Port
- Mid Tower Case w/ 250W Power Supply
- 101-key Keytronic Keyboard
- Microsoft Office Professional 4.3
- Microsoft DOS 6.22 & Windows 3.11
- Free Mouse Pad
- Free America Online

DX2-66 *$2245*

IVORY

486 PCI Processor

- **Intel DX-486 Processor**
- **8MB 72-pin RAM (max. 128MB)**
- **540MB SCSI HDD**
- **Diamond Stealth 64 PCI/1MB**
- **15" Digital NI Monitor**
- **Double Speed Internal CD-ROM Drive**
- ZIF Socket for Upgrade to Pentium Over Drive
- 256K Cache
- 1.44MB FDD
- Built-in NCR PCI SCSI Controller
- 2-16550 High Speed Serial Ports
- 1 Parallel Port
- Mid Tower Case w/ 250W Power Supply
- 101-key Keytronic Keyboard
- Microsoft Serial Mouse
- 16 Bit Sound Card
- Microphone & Headphones
- MYST, Rebel Assault, Doom Raptor, SIMM City 2000 + 27 More Titles
- Microsoft DOS 6.22 & Windows 3.11
- Free Mouse Pad
- Free America Online

DX2-66 *$1995*

PINK

486 PCI Processor

- **Intel DX-486 Processor**
- **8MB 72-pin RAM (max. 128MB)**
- **420MB IDE HDD**
- **Diamond Stealth 64 PCI/1MB**
- **15" Digital NI Monitor**
- **Double Speed Internal CD-ROM Drive**
- **Sound Blaster 16 Sound Card**
- ZIF Socket for Upgrade to Pentium OverDrive
- 256K Cache
- 1.44MB FDD
- Built-in PCI IDE Controller
- 2-16550 High Speed Serial Ports
- 1 Parallel Port
- Mid Tower Case w/ 250W Power Supply
- 101-key Keytronic Keyboard
- 3 Button Serial Mouse
- Stereo Speakers & Microphone
- Quicken, Rebel Assault, Wing Commander, Links + 38 More Titles
- Microsoft DOS 6.22 & Windows 3.11
- Free Mouse Pad
- Free America Online

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- Microsoft Encarta Encyclopedia
- Microsoft Golf
- Microsoft Works
- Microsoft Money
- Microsoft Entertainment Pack
- Danger Creative
- Sim City 2000
- Scene

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Creative Lab

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- Entry Level Multimedia Upgrade Kit.
- Sound Blaster card, new dual speed drive Photo-CD compatible
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- Sound Blaster 16, new dual speed drive, Photo-CD compatible
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- Game Blaster 16
- Double Speed CD-ROM Drive
- High Performance Joystick & Speakers
- Top Games Bundled CD-ROM Titles

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Sound Blaster Multimedia Office

- Sound Blaster 16 ASP
- Creative Double Speed CD-ROM Drive
- Microsoft Office Professional 4.3
- Microsoft Encarta™ Encyclopedia
- Microsoft Sound System 2.0
- Creative VoiceAssist™
- Creative TextAssist™
- Audio Compression Software and Hardware
- Microphone
- Stereo Headphones

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Digital School House

- Sound Blaster 16-16-Bit Stereo Sound Card
- Double Speed, Multi-Session CD-ROM Drive
- Stereo Speakers for Accurate Sound Reproduction
- 20 High-Quality Multimedia and Educational Titles

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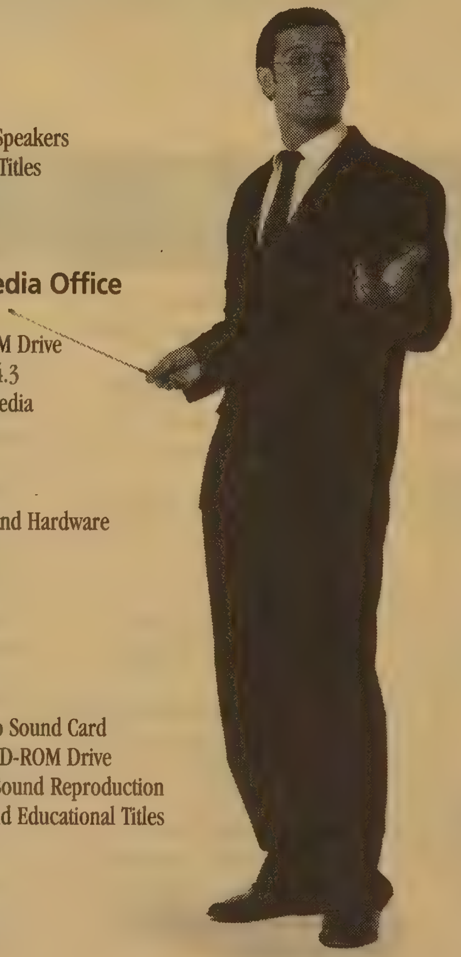

Diamond Multimedia Kit

- Kit 5000 w/Quad-Speed CD-ROM
- 16-Bit, CD Quality Sound Card, Wave Table Upgradable
- 30 + Best Selling Titles
- Premium Stereo Speaker, Headphone & Microphone
- Quick Start Video for Easy Installation
- Works with all Sound Blaster Compatible Games

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- Kit 4000 w/Quad-Speed CD-ROM
- 16-Bit, CD Quality Sound Card, Wave Table Upgradable
- 11 Best Selling Titles
- Premium Stereo Speaker, Headphone & Microphone
- Quick Start Video for Easy Installation
- Works with all Sound Blaster Compatible Games

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- Kit 1000 w/Double-Speed CD-ROM
- 16-Bit, CD Quality Sound Card, Wave Table Upgradable
- 30 + Best Selling Titles
- Premium Stereo Speaker, Headphone & Microphone
- Quick Start Video for Easy Installation
- Works with all Sound Blaster Compatible Games

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CHINON	
Double Speed SCSI II Internal	
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Includes Controller 320ms/300KB/sec 64K Cache Double Speed	$145
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Creative Labs	
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Sound Blaster 16 SCSI 2/with ASP	$169/191
Sound Blaster 16 MultiCD/with ASP	$129/165
Wave Blaster	$169
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Video Blaster RT200	$299
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Sound Wave 32 + SCSI	$199
Game Wave 32	$119
Sound Wave 32	$179
Video	$349
Video Pro	$539
Diamond	
Sonic Sound LX	$129
Video Star Capture	$329
Video Star Pro	$489
Logitech	
Logitech SoundMan 16, 16-bit Sound Card	$98
Media Magic	
16 Bit Sound Card	$79

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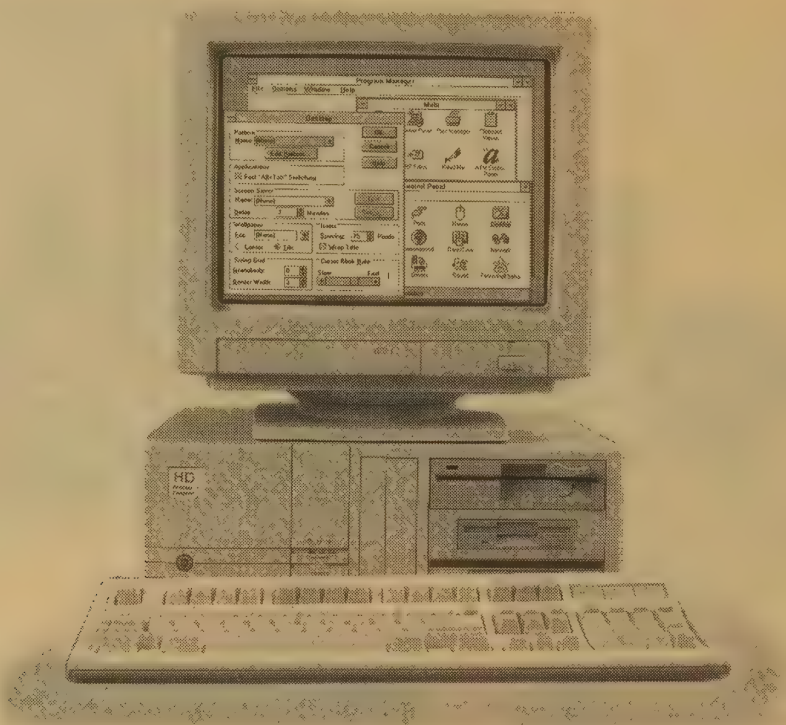

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P5 PENTIUM File Server

- Intel Pentium 90MHz CPU
- Asus PCI EISA Motherboard
- Full Tower Case w/300 Watt Power Supply
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- 256KB External Cache
- TEAC 1.2 & 1.44 MB Floppy
- 2.1GB Wide SCSI Hard Drive
- Adaptec 2940 Wide PCI SCSI Controller
- 2-16550 High Speed Serial Ports
- 1 Parallel Port
- MGP Card
- 14" Monochrome Monitor
- 101 Key Keytronic Keyboard
- Microsoft Serial Mouse
- Quad Speed SCSI Internal CD-ROM Drive

$3995

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486 Workstation

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- Desktop Case w/250 Watt Power Supply
- 4MB RAM
- TEAC 1.44MB Floppy Drive
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- 101 Key Keyboard
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PCI Ethernet Card	*$129*
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Accesories

RG58 Coax Cable BNC 10'	*$8*
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Microdyne/Novell

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NE-2000T Plus	*$115*
NE-3200 EISA 32bit Coax/TP	*$539*
NE-2000 Plus 3	*$129*

Ethernet Adapters

Compatible

NE-2000 16bit Coax/10BT	*$42*
NE-2000 16bit Combo	*$47*
NE-2000 16bit 5 pack	*$235*
EP-888A Pocket Ethernet BNC+10BT	*$145*
EP-808A 8Port Ethernet HUB	*$199*
EC-812 12Port Ethernet HUB	*$449*
EE-840 32Bit EISA Ethernet	*$289*

Intel

Etherexpress 16 16bit 5 Pack/20pack	*$575/1995*
16bit Ethernet Combo PCLA 8100	*$129*
16bit Ethernet BNC PCLA 8110	*$115*
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16bit Ethernet Combo PCLA 8105/Flash	*$159*

3COM

3C503 Etherlink II 16 Coax/TP	*$167*
3C503 Etherlink II 16 5pack	*$785*
3C507 Etherlink II 16 Coax/TP	*$295*
3C509 Etherlink III Coax/TP	*$117*
3C509 Etherlink III 5pack	*$528*

Ethernet Adapters

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Ether card plus elite 16 Coax/TP	*$119*
Elite ultra 16bit Coax/TP	*$115*
Elite ultra 16bit 6pack/24pack	*$675/2375*
SMC Ultra 16 Bit Ethernet Combo	*$135*

Cogent

PCMCIA UTP	*$199*
32-bit PCI Full Duplex Combo	*$159*
32-bit PCI Full Duplex UTP	*$139*
32-bit PCI 4-Port UTP Full Duplex	*$529*

DLINK

DE-600 TP Pocket Ethernet 10BT	*$199*
DE-205 TP 16Bit Ethernet 4 Port 10BT	*$290*

INFO Express Ethernet Adapter

16Bit BNC/10TP	*$60*
32Bit VLB/Combo	*$139*

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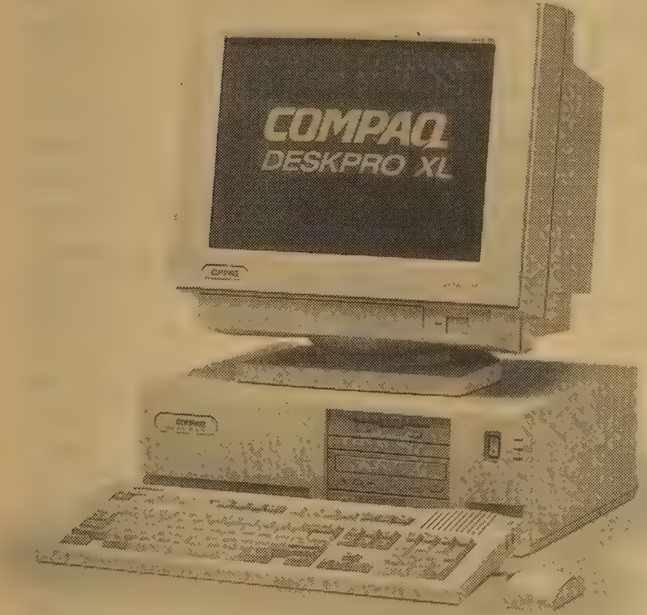
COMPAQ



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Deskpro XE

- **Pentium 60 MHz CPU**
- Mini Tower Case
- Dektop Case
- 8MB RAM Expandable to 136MB
- 525MB IDE Hard Disk
- 1024x768 1MB VRAM SVGA Card
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- 101 Key Keyboard
- Energy Star Compliant
- 3 Year Worldwide Limited Warranty
- **Monitor Sold Seperately**

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COMPAQ
Prolinea MT

- **486DX2-66 CPU**
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- 420MB HDD
- 4MB RAM Expandable to 64MB
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- Built-in Trackball
- MS DOS 6.2 & Windows 3.1
- Tabworks
- 101 Key Keyboard
- Energy Star Compliant
- 3 Year Worldwide Limited Warranty
- **Monitor Sold Seperately**

$1829

COMPAQ
Contura 400 Notebook

- **486DX2-40 CPU w/8KB Internal Cache**
- 250MB HDD
- 4MB RAM Expandable to 20MB
- 2 PCMCIA Type II Slots or 1 Type III
- Built-in Trackball
- AC Adaptor/Rechargable Battery
- Weighs 5.9 lbs
- 3 Year Worldwide Limited Warranty

400C PM $2495

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- ***3 Years Warranty***
- ***First Year On-Site Service***
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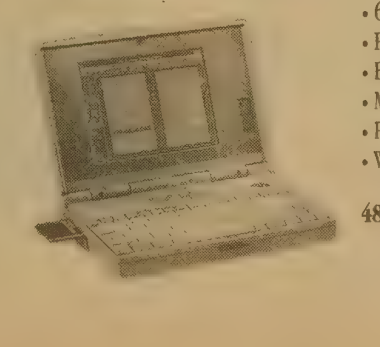
- Intel Enhanced Processor
- 4MB Expandable to 20 MB
- Removable Display Mono STN, Color DSTN or Color TFT
- Removable 1.44 FDD Disk Drive
- Removable Built-in Trackball
- Removable HDD, 120MB TO 500 MB
- Accelerated 32-bit VESA Local Bus VGA
- 86K, Full function Keyboard
- Built-in Microphone and Speaker
- One PCMCIA Type III or Two PCMCIA Type II
- Dimensions and Weight:
  Mono STN: 11.3" x 8.8" x 1.5"; 5.3 lbs
  Color STN: 11.3" x 8.8" x 1.6"; 5.7 lbs
  Color TFT: 11.3" x 8.8" x 1.7"; 6 lbs

Model	Price
486SX-33 Mono EXO-2504M-MDDP **4MB 340MB/HD**	***$1725***
486DX2-50 Mono EXO-2804P-MDDP **4MB 340MB/HD**	***$1950***
486DX2-50 Dual, EXO-2804P-DDDP **4MB 340MB/HD**	***$2370***
486DX4-75 Dual, EXO-2904T-DDDP **4MB 340MB/HD**	***$2800***
486DX4-100 Dual, EXO-2904R-DDDP **4MB 340MB/HD**	***$2892***
486DX2-50 Active, EXO-2804P-TDDP **4MB 340MB/HD**	***$3360***
486DX4-75 Active, EXO-2904T-TDDP **4MB 340MB/HD**	***$3630***
486DX4-100 Active, EXO-2904R-TDDP **4MB 340MB/HD**	***$3766***



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- Intel SL Enhanced Processor
- 4MB RAM Expandable to 20MB
- 1.44MB Built-in Floppy Disk Drive
- 84 Keys Keyboard
- PCMCIA Type II Slot
- Built-in Trackball
- 10" VGA/Mono Display
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- Physical Dimensions 8.5" x 11" x 1.6"
- Weight with Battery 5.8 lbs

Model	Price
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TWINHEAD
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- 4MB RAM Expandable to 20MB
- 1.44MB Built-in Floppy Disk Drive
- 84 Keys Keyboard
- 256 Color Display/512K RAM
- PCMCIA Type II Slot
- Built-in Trackball
- MS DOS 6.2, MS Windows 3.1
- Physical Dimensions 8.5" x 11" x 1.8"
- Weight with Battery 6.3 lbs

Model	Price
SM2-4DX/33S (486DX-33 w/200MB HD Dual Scan Color)	***$2350***
SM2-4DX/33P (486DX-33 w/200MB HD Active Color)	***$2950***
SM2-4DX2/66T (486DX2-66 w/200MB HD Active Color)	***$3570***

TWINHEAD
4 Pounds Powerful Subnote

- Intel SL Enhanced Processor
- 4MB RAM Expandable to 8MB
- 1.44MB External Floppy Disk Drive
- 8" Side lit VGA display, 64 shades
- 85MB IDE Hard Disk
- 79 Keys Keyboard
- 64 Gray Shades VGA Display
- PCMCIA Type II Slot
- Built-in Trackball
- MS DOS 6.2, MS Windows 3.1
- Physical Dimensions 7.1" x 10" x 1.6"
- Weight with Battery 4 lbs

486SL-33-4 ***$1070***

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Item	Price
Memory Upgrade 4MB to 8MB	***$240***
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PCMCIA Ethernet Card	***$165***
PCMCIA Modem/Ethernet Combo Card	***$Call***
Carrying Case	***$15***

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60 MHz PCI/ISA Excalibur 256K	$1095
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486 EISA/VESA Enterprise IV 256K 33/66MHz	$740/835
486 VLB/ISA Super Voyager 256K 33/66MHz	$575/695

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90 MHz PCI /ISA Neptune 256K	$445
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60 MHz PCI/ISA 3PCI Slots 256K	$485
486 EISA E2 256K	$395
486 EISA/VLB 256K	$495
486 JX30 VLB/ISA 256K	$285
486 VLB/ISA 256K	$235

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60 MHz PCI/ISA Mercury 256K	$325
486 PCI/ISA Saturn 256K	$295
486 VLB/ISA SIS Green 128K	$145
486 VLB/ISA Support DX4 256K	$175
Pentium586 -90MH pci/ISA/512K	$350
Pentium586 -66/60MH pci/ISA/512K	$300

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90 MHz PCI/ EISA Mercury 256K	$585
90 MHz PCI/VLB/ISA Opti 256K	$415
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66/60 MHz VLB/ISA Opti 256K	$395
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Controllers

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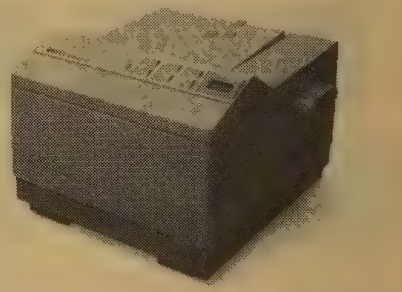

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The Usefulness Of Magic

Plus: Sharp's Zaurus

In my last column I spent some time describing Sony's new entry into the personal communicator market, the PIC-1000, better known as the MagicLink. For those of you who missed that column: The MagicLink is based on the General Magic MagicCap operating system, sells for $899, weighs 1.2lbs., and measures 7.5" x 5.2" x 1" (making it quite portable, but still too big for a pocket, and even larger than the Newton). It comes with 1 MB of RAM, a single PCMCIA Type II slot, a serial port, and a built-in 2400 baud data/9600 baud fax modem (although somewhat slow, a nice feature to have built-in).

I've had a chance to use the MagicLink more extensively since my last column, and I have a number of comments to make both about the unit as it is now and how I see it fitting into the PDA marketplace as time goes on.

Good Magic

What do I like about the MagicLink?

Well, as I mentioned last time, it doesn't do handwriting recognition, but instead uses an on-screen keyboard. Although not quite large enough for touch typing (not to mention the fact that the lack of tactile feedback makes it difficult to type accurately), it's still a lot easier to enter information than with the Apple Newton.

The user interface, while initially perhaps somewhat off-putting in its cutesiness, is nevertheless both easy to get around and fast enough to satisfy many power users; in addition to the indirect but friendly ways of getting at information, there are a number of features provided to allow quick navigation around the MagicCap virtual world.

For example, to get back to the home desk, you need only tap on the desk icon that is always present at the bottom of the screen. Similarly, the operating system provides a lot of thoughtful features to make data retrieval and entry quick and easy, such as providing "guesses" as to what you're trying to type based on the context (for example, if you're entering a name, after you've entered a few letters it tries to find the name in your address book and "suggests" the remaining characters for you; if it's guessed wrong you can just keep typing and the machine will retract its "guess").

The MagicLink comes with a number of versatile and powerful applications in addition to the basic MagicCap operating environment, such as the PenCell spreadsheet and Pocket Quicken. I was gratified that I didn't have to look at the manual in order to use the unit; it's rather self-explanatory. It comes with a pleasant tutorial which guides you around the basic features of the machine, as well as some more sophisticated customization options; this introduction is very well done, and even comes with an automatic sign-up procedure that gets you up and running with the email service built into the unit, AT&T PersonaLink Services.

The user interface, while initially perhaps somewhat off-putting in its cutesiness, is nevertheless both easy to get around and fast enough to satisfy many power users.

Magic, But Not Perfect

After playing with the MagicLink for a while, however, I have a number of caveats.

The display is barely readable; one has to use it in very good direct light, and even then the contrast is not all that good. This is perhaps one of the weakest aspects of the unit; although not fatal, it does make the machine a lot less pleasant to use. Hopefully Sony will be able to address this flaw in a future upgraded machine.

Interoperability with other operating systems, networks, and computers is still primitive; essentially, you're limited at present to sending and receiving text email. Also, while you can send email to another PersonaLink subscriber by simply typing in their full user name, if you're corresponding with people on the Internet or elsewhere, your address looks like a huge long digital number, impossible to remember, and even worse than CompuServe email addresses. This is a design flaw in the AT&T service, and although it's not the fault of Sony or General Magic per se, it indicates a curious lack of attention to ease of use for those who want to exchange information with people outside the isolated world of Telescript and MagicCap.

I don't see this sort of attitude as boding very well for the future of AT&T's mail system; it's the same sort of proprietary attitude which has destroyed or severely limited the expansion of many other would-be technology standards. It seems they want their email system to be easy to use, but almost purposefully, it seems, they make the technology opaque when it comes to interacting with the rest of the universe, perhaps in an ill-conceived

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attempt to encourage people to remain entirely within their own little world. We've seen this sort of strategy fail time and again in the past, but perhaps AT&T is too big and bureaucratic to realize the folly of this sort of approach.

However, all the blame for difficulty of interoperability cannot be laid solely at AT&T's doorstep; General Magic also shares a little here. The MagicCap technology is designed to work with Telescript-based networks and servers—a noble idea in theory, but something which might have worked better as value added on top of support for existing standards for serving up information, such as the World Wide Web or even simply gopher and ftp.

It would be nice, for example, if you could use the MagicLink to interface with the Internet directly, or if MagicCap mail supported, say, the MIME standard for binary attachments, which would have allowed MagicCap and Internet-based mail programs to exchange binary information in a natural fashion. Unfortunately, however, MagicCap does not support these standards but creates an entirely incompatible one of its own which, although technically impressive, still has a tiny installed base exacerbated by narrow interconnectivity with existing technology and networks.

Although MagicLink and Zaurus are comparable in price, they come from different design heritages.

This violates a basic market-driven design principle which has been proven time and again: Give the user everything and then some, don't ask them to choose one technology over another. Users want their cake and they want to eat it too, and companies that ignore this do so at their own peril.

Magic Vs. Wizard

Nevertheless, I like MagicLink and the technology that supports it. The idea of intelligent agents, built into the Telescript design, is one which can allow inexpensive, low-bandwidth data connections to be used in a way which would still allow a great deal of power. This requires, however, a proliferation of Telescript-based services, and the barrier to entry in that case is the difficulty of creating Telescript itself. It remains to be seen how quickly or easily these services will come into being. This highlights even more the need for interoperability with existing standards which already have a significant infrastructure built up.

And though I like this machine, I'm not sure how broad its market penetration will be. There are significant barriers to overcome. Although the interface for this machine is indeed quite usable, most of

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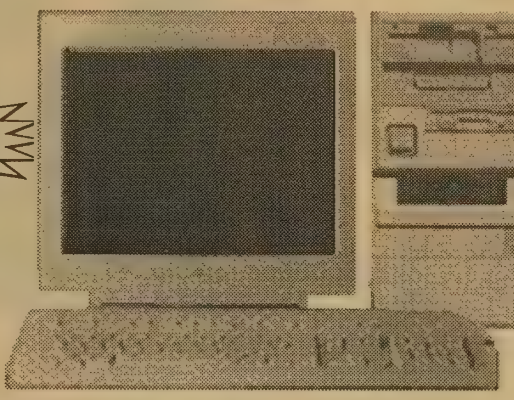

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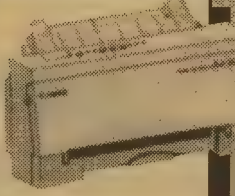

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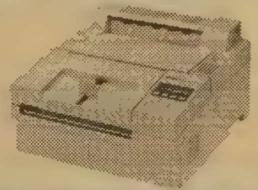

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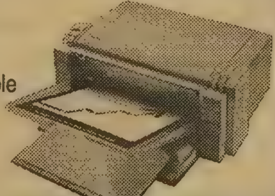

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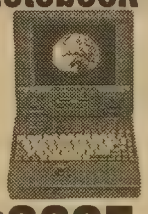

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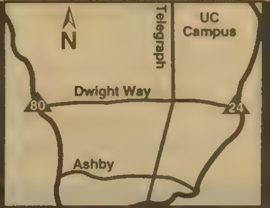

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Palmtops *continued*

the basic functions it provides can be had for a much lower cost in the form of a Casio SF-R20, a Sharp Wizard, or a Psion 3a organizer. Although the learning curve for these machines is more steep than for the MagicCap unit, it's hard to say whether this alone will be enough to prod customers to spend the extra money on the new Sony.

And even though the MagicLink is quick enough to be useful, I find, in fact, my pocket organizer actually a bit faster in terms of data entry and retrieval for simple things like entering a quick note or retrieving an address. To get the phone number of a friend of mine, for example, requires merely hitting the address book key, typing the first few letters of her name, then hitting "Search." The same operation on the MagicLink is similar, but does require a few more "keystrokes" (or pen taps) and takes just a little longer.

Organizers have other advantages as well: the batteries last much longer, they are smaller and lighter and can fit into a pocket much more easily, and they usually have keyboards, which are still faster to type on than the on-screen variety used in the MagicLink (though as I've said before it is nevertheless an improvement over unreliable handwriting recognition).

A number of the flaws mentioned above can be addressed by third-party applications and advances in hardware technology, which will lower the cost of the unit and improve things like display contrast. The technology looks very promising, and it's just a matter of time before the PDA industry finally takes off: the issue is not whether, but when, and we'll just have to wait and see how successful the MagicLink design will turn out to be.

Sharp Zaurus Emerges

A new and rather intriguing PDA has been announced by Sharp, the makers of the popular Wizard line of organizers. Like their OZ-9000 series organizers, the Sharp Zaurus combines both pen and keyboard input.

Unlike the 9000 series, however, it has a totally new windowing, multitasking operating system called Synergy; a built-in word processing program with spell checker; a mail program; a drawing function (which allows drawings to be embedded in word processing documents); data hyper-linking capabilities; a high-speed infrared data communication port (which, interestingly, supports data transfer with a Newton); one meg of RAM; a true PCMCIA Type II slot, which can be used for both Flash RAM (up to 16MB) or SRAM (up to 2MB) expansion; and a faster internal processor.

RESOURCES:

Sharp Zaurus PDA
Sharp Corporation
1-800-321-8877

Sony PIC-1000 Magic Link
Sony Corporation
1-800-342-5721

Despite the large feature set, this machine still supports organizer-like battery life; Sharp reports battery life of up to two months, far longer than would be expected for a high-power-drain machine such as the Apple Newton. I'm a bit disappointed, however, that it does not include a spreadsheet; hopefully this can be made available later as an add-on. The Zaurus can run third-party applications downloaded into its memory.

The unit will retail at $749 for the base unit, or $849 including Sharp's CE-FM4 mini fax modem (the modem is also compatible with the OZ-9000 series Wizards), which attaches to the side of the unit and leaves the PCMCIA slot free. Some are guessing that the street price for the machine will be around $500 for the base unit and $600 including the fax modem.

It will be interesting to see how the MagicLink and the Zaurus end up faring in

continued on page 156

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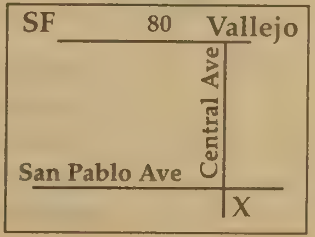

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RESOURCES:

Uninstaller 2, $69.95
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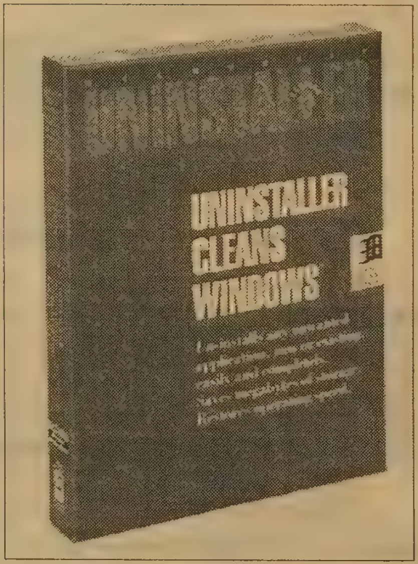
1-800-922-3383

PC911, $49.95
CyberMedia
2029 Century Park E.,
Suite 810
Los Angeles, CA 90067
1-800-529-2373

Almost everyone has moved from DOS to Windows on their portable. While there are advantages to the Windows interface over standard MS-DOS, there are also drawbacks. It is these drawbacks and how to deal with them that I will be discussing this month. The main drawback to Windows is that it is a good deal more complex than plain old DOS. As long as everything works well, there is no problem, but as soon as you have trouble, you will realize that Windows is far more complex than any interface you have dealt with before.

If you are a user who installs your software applications and never fiddles with your machine again (glory to you!), Windows will probably never cause you much of a problem, but if you are the kind of user who installs the latest version of programs that you use or tries new programs in the hopes of finding the ultimate solution, you undoubtedly have noticed that removing a Windows-based program from your hard drive is a good deal more complex than the same job in DOS.

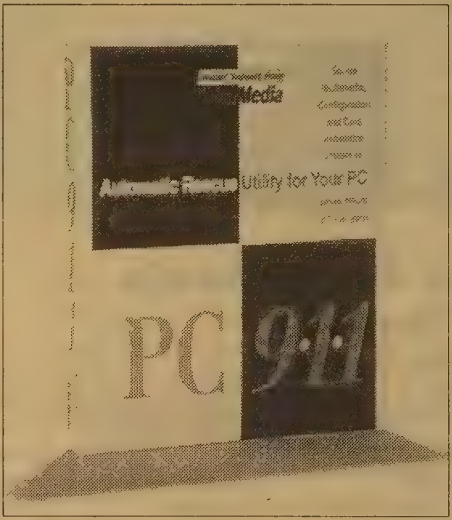


Not only do you have to erase all of the files, but you have to modify the program manager in Windows to remove the icons. Even then, you may still not be done, as many programs make modifications to your win.ini file and/or your system.ini file. Unless you either know what you are doing or have explicit directions for removing a program, you are skating on thin ice.

Typically, portables have smaller hard drives than desktop computers and every bit of space is to be guarded carefully as no hard drive is ever large enough. Perhaps you have wished for a program that will allow you to remove excess files that creep into Windows systems.

MicroHelp Uninstaller v2 to the rescue! This nifty program installs on your hard drive and lets you simply and easily select any application you want to uninstall and then removes all of its bits and pieces from your hard drive for you. But it does a whole lot more. If you have been running Windows for a while and adding and taking out programs, you can ask this program to clean up your files for you. By selecting Orphan Finder, you can get rid of all the old parts that are left over from long gone programs. Duplicate File Finder does just what its name implies and lets you gain back hard drive space. System cleanup lets you get rid of files that Uninstaller feels are not necessary for the smooth operation of your system. INIClean lets you clean up your INI files of unwanted and unneeded entries that are just taking up disk space.

This program makes something that is pretty technical into something that almost anyone with a little patience can master. If you want to do nothing more than have a tool to remove Windows programs that you no longer want, Uninstaller is simple—you can do this without reading any of the documentation. If you want to take advantage of the more sophisticated aspects of this tool, you may have to read specific sections of the manual. I recommend that you spend a little time reading the clear explanations in order to get more from this powerful tool.



Another powerful tool has also come along to help Windows users who do not consider themselves power users or highly technical. PC911 is designed as emergency help when your computer won't boot up properly. Once installed, the program prepares an emergency boot disk that has your essential files. Each time you start your computer, it compares your autoexec.bat, config.sys, win.ini, and system.ini files with what they should be and lets you know if there is any change. This warns you to make a new copy of your emergency startup disk. At any time, you can go back to a previous version of these essential files and thereby eliminate any problems that either you or your computer caused.

The utilities included with the Uninstaller make it easy for the novice to isolate problems. You can do similar things on your own, but this is an easy way to insure against the unexpected. This program requires only a small amount of disk space and may be worth it in peace of mind. ■

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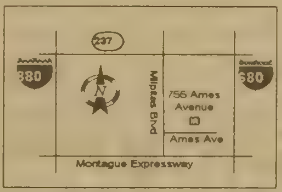

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Several times over the past couple of years, I have raved about Hewlett-Packard's OmniBook series of sub-compact portables. They have returned yet another time with a winner—the OmniBook 600. Although they still use the OmniBook moniker, and have retained the size and format of its earlier models, the 600 is designed to compete directly with the world of notebook computers. While earlier entries were marked by long battery life rather than a rechargeable nickel metal hydride power pack, they also lacked a color display and backlighting. In order to offer the full backlit color display, the OmniBook needed more power. The new, small nickel metal hydride battery (extras $99) provides the needed power for up to four hours before recharging.

The OmniBook 600, however, is more than just the old OmniBook, which is still available, with a souped up display. It is now powered by a 486 processor running at either 50MHz or 75MHz. The basic system comes in either a 4MB or 8MB RAM configuration, expandable up to either 12MB or 16MB ($399 for an extra 4MB, $649 for an extra 8MB); and the hard drives range from a low end of 171MB up to 260MB. Since the hard drive is a removable PCMCIA card it is likely that even larger drives will be available in the near future and you can swap drives yourself. Hewlett-Packard has positioned this computer as a full-powered notebook, continuing to beat the competition in size and weight.

It weighs in at 3.8lbs. and measures about 8" x 11" with a thickness of just a tad over 1.5". A tiny external floppy drive that holds 3.5" disks comes standard and attaches by an included cable. You have other options for transferring data and files between the OmniBook and a desktop computer. Traveling Software's LapLink Remote is built into the system so you can easily connect the portable to a desktop machine with either a serial or parallel cable. The OmniBook 600 also comes with two PCMCIA slots. These slots are both Type II and stacked one on top of the other in order to offer the flexibility of inserting a single Type III card.

The display is passive matrix color, measuring 8.5" diagonally. It is easy to attach

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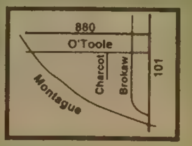

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Laptops *continued...*

an external monitor through the video port on the back of the OmniBook. The keyboard is full size—whatever that means—so you do not have to scrunch your fingers to work on the computer. If you are working at a fixed location, you can purchase a port replicator ($349) which gives you a great deal of added capability. To the replicator, you can attach the floppy drive, printer, serial device, external CD-ROM, network connector, external keyboard, PS/2 mouse, and external display. In short, you can pretty much tap the power of the OmniBook and set it into a much more comfortable setting. The OmniBook simply slips into the port replicator. Slip it out when you are on the go!

The OmniBook series offers a number of unique features. First, when you power down, you simply shut the unit off. When you power up, you will be exactly where you left off. Of course, it is wise to save files and such as a precaution, but it is really convenient to simply shut down and power up to where you left off. A second unique feature is the use of special function keys to open your frequently used applications. There are twelve function keys across the top of the unit. Hitting these in conjunction with the special Fn key brings you into the designated application, saving lots of time. This removes the need to work through the Windows Program Manager to open frequently used applications.

TMS-DOS 6.2, Windows for Workgroups 3.11, and a set of programs that work within a personal information module are also included. While these applications work, I am still astounded that HP has not yet rewritten the phone directory application to allow you to import a telephone and mailing list from another application. For me, it makes this application completely useless as I am not going to reenter the hundreds of names I have in my electronic address/phone file.

There is so much good to say about the OmniBook 600 that it would be unfair to dwell on the one weakness I find. In addition to everything else, Hewlett-Packard provides a three-year warranty. During the first year, they will ship, by overnight delivery, any replacement parts or a whole unit if that is what you need. You simply can't beat either this machine or the company that stands behind it. ■

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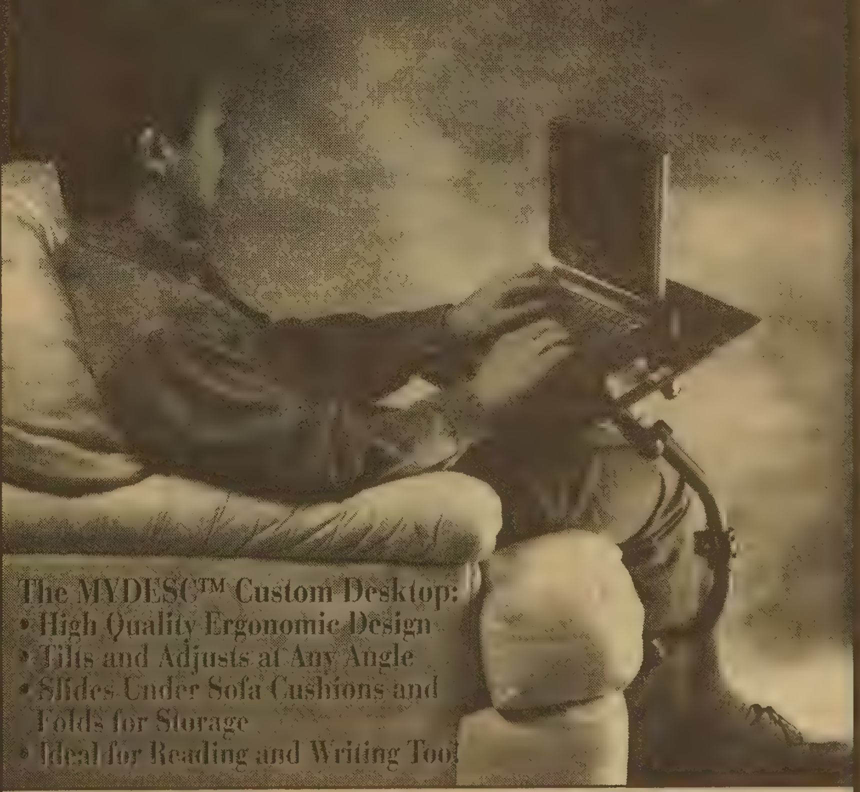

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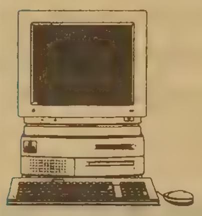

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Connecting Your LAN To The Internet

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RESOURCES:

Internet Access Providers— An International Resource Directory
Greg R. Notess
1994, Mecklermedia
ISBN 0-88736-933-2

With the importance of the Internet growing by leaps and bounds, many companies are coming to the conclusion that an Internet connection is an important and necessary business tool. The first symptom of the Internet's growing importance as a business tool has been the prevalence of Internet email addresses printed on people's business cards and stationery. Now many companies, large and small, are establishing a presence on the World Wide Web, and not just computer firms. Companies of every size and type are setting up shop on the Net, from financial services giant Visa USA, which has a series of Web pages describing their services and where to report lost credit cards, to the tiny About Time Music Company, which has an online catalog of music CDs on the Web, complete with sound bytes.

The Internet's growing popularity has prodded many companies to look into connecting their corporate LANs to the Internet, but connecting a LAN to the Net is a big project, and there are many more LAN environments looking to connect to the Net than there are LAN administrators who know how to do it. This column is the first in a three-part series of articles that will explain what's involved in setting up an Internet LAN connection.

The first step in connecting a LAN to the Net is to figure out how your company plans to use the Internet. If all your company wants to do is be able to send and receive email, for example, the requirements for your Internet connection will be very different from a company that wants to set up its own Web server and use it to advertise services on the Internet. The best way to do this is to start figuring out who in your organization needs access to the Net, which Internet resources they need access to, and what information your organization wishes to make available to other users on the Internet. Once you have a clear idea of what you plan to use the Net for, you can start planning your installation.

An Internet connection is a lot like a telephone line. At one end of the line you have your phone, and at the other, the telephone company. Your phone can have many special features built into it, like a "speed dialer" and answering machine, but you can also buy these same features from the phone company. When you order your phone line you have to decide what features you want, and whether you want to hassle with buying and maintaining a phone with those special features, or just let the phone company provide those services to you. Also like a telephone line with the phone company, different Internet access providers offer different services, and charge differently for those services, but unlike the phone company, you don't have to put up with just one choice when it comes to a provider.

> The first symptom of the Internet's growing importance as a business tool has been the prevalence of Internet email addresses printed on people's business cards and stationery.

Typically, there are several different Internet access providers to choose from, and you should try contacting several different providers before you buy in to a particular service. Once you know how you plan to use your Internet connection, you should start contacting some of your local Internet access providers and tell them what your plans are (the *Internet Access Providers* book, mentioned in the Resources list that accompanies this article ,is a good place to find the names and addresses for many Internet access providers). Be prepared to answer questions about how you plan to use the Net, how many workstations are on your LAN, and what your experience level is with TCP/IP networking. Once you've explained all this to the access provider, he or she should be able to start formulating a proposal for how to set you up.

Ask lots of questions while you're trying to decide on an Internet access provider, like do they have "round the clock" technical support? Can they provide references? What special services do they offer? And of course you'll want to ask ,"How much does all this cost?" Make sure you're comfortable with the provider you select. The quality of your connection and your company's image on the Internet will depend a great deal on how good a job your access provider does, and it's a pain in the behind to switch vendors if you discover you've made the wrong choice.

The first hurdle you'll have to cross when establishing what kind of service your Internet access provider should provide you with is the type of telephone connection you want between your LAN and your provider. If you're not planning on setting up a high-volume Internet site, your provider will probably suggest either a 56k to 128k bits per second (bps) "frame relay" or "ISDN" connection to their service. If you expect your needs will grow over time, you should probably consider getting a "fractional T1" frame relay connection, because it allows you to change the speed of your data connection, from 128kbps up to 1.5Mbps without having to replace your data communications equipment or router. (A router is a device that "routes" traffic sent from your network to the Internet to your Internet access provider.)

> There are many more LAN environments looking to connect to the Net than there are LAN administrators who know how to do it.

Once you've settled on what type of telephone connection you'll use, it's time to settle on a domain name. A domain name is logical name for your organization, or "domain," that people can use to address email messages and to locate Internet resources on your network, like "*microsoft.com*," and "*oakland.edu*." Domain names are registered with the Internet Network Information Center (NIC), and have two parts. The first part is a name, like "*microsoft*" or "*oakland*," the second part identifies the type of organization, like "*.com*" for commercial Internet sites, and "*.edu*" for educational institutions. If your organization is a for-profit business, you'll be assigned the "*.com*" extension. You also need to remember that only one organization can have any particular domain name, so if your company name is "Irving, Bangor, and Ming," you'll have to pick a domain name other than "*ibm.com.*" It's already taken.

That about wraps it up for what to look for when you're hunting for an Internet access provider. Next time I'll talk about what you need at your end of the connection, and help you figure out what an Internet "server" does. ■

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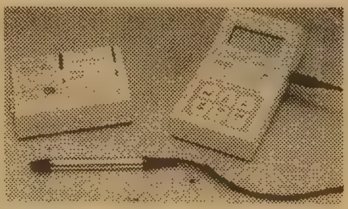

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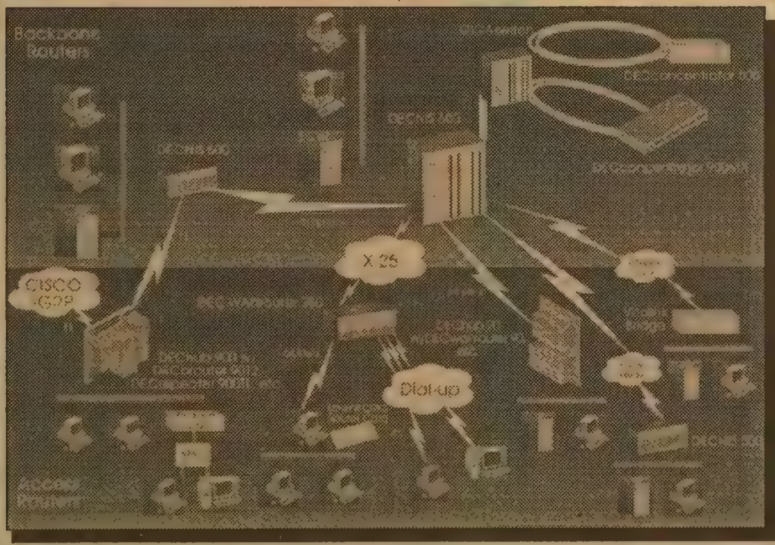

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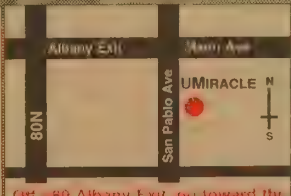

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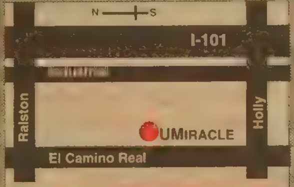

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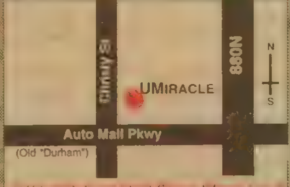

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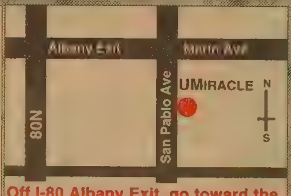

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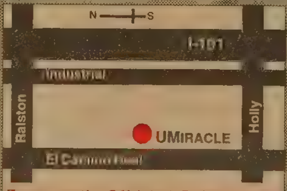

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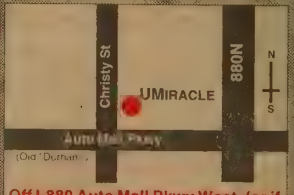

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OS/2 • BY FABIAN PASCAL

OS/2: Those Irking IRQs—Part I

When I upgraded to a 486/33 EISA system in 1991, it was the latest and greatest, and it has served me well over the years. At the time, motherboards did not incorporate I/O ports, and my system came with an 8-bit two serial/one parallel (2S/1P) I/O card, which could only use standard addresses and IRQs (3–5,7; see sidebar).

With a serial mouse, a laser printer, and the internal SatisFAXtion faxmodem card implementing its own port, one parallel and two serial ports were sufficient. The lack of either 16550 UARTs for the serial ports, or of the bidirectionality for the parallel ports were not serious problems, because, as I explained in a previous column, the latest version of the faxmodem emulated a 16550 UART in software; and most software did not take advantage of bidirectional parallel ports.

With the increasing number of peripherals—for example, I added a parallel port tape drive (see review in a previous column), an external 28,800bps V.34 faxmodem (more of it in a future column), and an HP DeskJet 540 printer—one can run out of ports, addresses, or IRQs pretty quickly. Moreover, external modems don't provide their own ports, so they must rely on the system's serial ports for 16550 UARTs, which are essential at the higher speeds. Newer software, such as that which controls the DeskJet 540, now takes advantage of parallel port bidirectionality, which improves performance and allows for two-way communication with the printer.

Serial And Parallel Ports

The ISA/EISA architecture supports up to four serial ports (COM1–4) and up to three parallel ports (LPT1–3). There are standard addresses for COM1, 2, but only "usual" ones for COM3, 4 (they are frequently used by other devices, e.g., my ATI Ultra Graphics Pro video card uses the COM4 address, 2E8). Here's the usual setup:

COM1: 3F8/IRQ4
COM2: 2F8/IRQ3
COM3: 3E8/IRQ4
COM4: 2E8/IRQ3

Similarly, the address/IRQ combinations for the first two parallel ports are standard, and "usual" for a third:

LPT1: 3BC/IRQ7
LPT2: 378/IRQ7
LPT3: 278/IRQ5

> THE ADDRESSES AND **IRQs** OF THE PARALLEL PORTS ARE HARDWIRED (CANNOT BE CHANGED) IN **OS/2**, WHICH ASSIGNS LPTs IN DESCENDING ADDRESS ORDER.

Since interrupts cannot be shared in ISA systems (only EISA or MCA cards allow sharing for their specific adapters), this setup will work as long as ports that share are not accessed simultaneously (some devices can do that without your knowledge).

In OS/2 the addresses and IRQs for the four serial ports are user-specifiable to the COM.SYS serial port driver in CONFIG.SYS, and they can be any combination in the hardware that is free. The addresses and IRQs of the parallel ports are hardwired (cannot be changed) in OS/2, which assigns LPTs in descending address order, as above. Some older IBM technical tip claims that the shared IRQ7 configuration is legal because "...OS/2 contains an algorithm that resolves the resource conflict by using the timer interrupt." But another, more recent document states that: "With OS/2 you can not use both addresses 3BC and 378 as printer port addresses. Both parallel ports (LPTs) would be sharing IRQ7."

Diagnosing Hardware Conflicts

As I explained in another column, I used the SatisFAXtion/400 internal faxmodem because its fax coprocessor is uniquely suited to OS/2's multitasking. But to this day Intel has steadfastly refused to support OS/2. The DOS driver for the modem component usually works all right in VDMs, and FaxWorks provides an OS/2 interface to the (separate!) fax component. But there are quirks, and when they occur the user is on their own. Moreover, Intel recently sold its entire faxmodem line and I have not been able to obtain from the new owner any intentions regarding OS/2.

Since 28,800bps modems and the V.34 standard are on the verge of becoming the new norm, I decided to add an external high-speed modem (more on that in a future column) for improved performance and keep the SatisFAXtion for its fax co-

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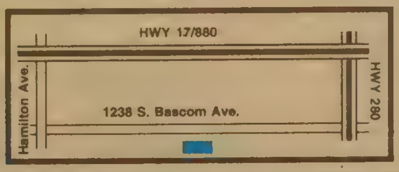

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processor and as a backup modem (always a good idea, see below). Hence: a need for COM3.

My 2S/2P I/O card by Quatech (reviewed in a previous column) is 16-bit, has access to high IRQs and bidirectional parallel ports, but it can use only standard addresses. With the SatisFAXtion/400 on COM2 and a mouse on COM1, the Quatech card left me a spare serial port to configure as COM3. But in whichever configuration I activated it, my SCSI adapter (at IRQ14) would no longer recognize the floppy drives (at IRQ6). Weird.

Hardware conflicts, particularly IRQs, can be really nasty, because they are very difficult to diagnose with software (even with special hardware it's not a sure thing). I've used several DOS utilities and never got the same results, some of which simply did not make sense. Then I came across the CTS Utilities on CompuServe, a set of several port diagnosing and fixing-DOS programs and asked John Jerrim, their developer, whether they would give accurate results in an OS/2 VDM. His reply: *"How I wish it would...but neither will anything else. One of the great advantages of OS/2 is that it is a true operating system—as such, it does a wonderful job of isolating the hardware from the users and software developers. The disadvantage of a real operating system comes when trying to troubleshoot the system—the isolation prevents software from doing much of what is needed—in essence, the diagnostic software ends up testing the various device drivers rather than the actual hardware. In other words (under OS/2) diagnostic software can tell you that everything is working when it's working, but can't tell you what's wrong when it isn't. The drivers just don't have the necessary technology designed into them for diagnostic purposes."*

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46732 Fremont Blvd.
Fremont, CA 94538
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CTSSPU (CTS Serial Port Utilities): $20, Personal: shareware utilities $35, Personal PLUS: adds User Guide, bonus utilities IRQInfo, $29 ($24 with purchase of a CTSSPU license)
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CompuServe: 76662,2315

The best that the average user can do, therefore, when conflicts are suspected, is to boot good old DOS, use utilities such as John's, and hope for the best (another reason to keep a DOS boot partition on your hard disk).

The CTS utilities were not very happy with the Quatech board (in fact, IRQInfo would not even run). Moreover, with the laser printer on LPT1, the parallel tape drive (also reviewed in a previous column) on LPT2, I ran out of parallel ports for the second printer (assuming, of course, that OS/2 does support three parallel ports). So I needed another I/O card.

One interesting card is **STB's 4-COM** because it implements four **16550-based** serial ports, all of which can share one IRQ!

Looking For "The" I/O Card

The ideal would be a 16-bit 4S/3P card with access to nonstandard addresses and shareable and high IRQs (10–15) and buffered 16550 UARTs for the serial ports; and which provides bidirectional parallel ports.

As far as I know, there is no 4S/3P card. Most cards are 2S/1P, some are, like the Quatech, 2S/2P; many have the problem that they're not flexible in terms of both IRQs and addresses, or don't have 16550 UARTs, or that the parallel ports are unidirectional—or any combination thereof.

One interesting card is STB's 4-COM because it implements four 16550-based serial ports, all of which can share one IRQ! It is fully configurable with respect to both IRQs and addresses, and if the default set of nonstandard addresses does not, for some reason, work in your system, you can even replace one chip with another and get a different set of nonstandard addresses! It comes with four short DIN-to-serial cables—more convenient than the spider cable of the Quatech. The 4-COM is recommended by the developer of the alternative serial port drivers to IBM's COM.SYS and VCOM.SYS drivers, which support its IRQ sharing.

Unfortunately, the 4-COM has a few drawbacks. The most obvious is, of course, the lack of parallel ports. It is, therefore, suitable when only serial ports are needed (usually BBS systems). You can, of course, use another card for parallel ports, but then you use two PC slots.

Another problem is that the configuration is quite confusing, and not just for end-users. For example, for the SatisFAXtion to use COM2, one port must be deactivated on the 4-COM. Only after considerable hassle (due to poor documentation and weak tech support) did we guess that the ports cannot be disabled, and the only solution is to configure the port to any unused IRQ and address. But why should a card whose obvious purpose is to give you access to more IRQs and addresses fritter a pair away?

FlexPort 42

This configuration avoids the sharing of IRQ7 by two ISA adapters, and I figured that the two printers will work one at a time. I also prefer the bi-directional ports for the printers. (The virtual print-to-fax driver in FaxWorks for OS/2 was also set at LPT3, see next column for a solution.)

For reasons already explained, the port configuration should be verified in DOS first. Tapcis, my DOS front-end to CompuServe, can be configured for nonstandard IRQs and addresses, but MacMail, a DOS front-end to MCI Mail, cannot. By using the mouse on COM4 (the Logitech Cordless mouse can be set for any COM port and IRQ), I was able to work around the problem (but see below).

The BIOS of older systems (mine is a 1988 Phoenix) may not recognize "unconventional" COM3 and COM4 configura-

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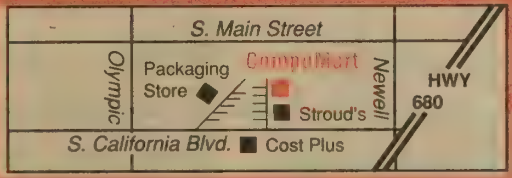

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tions, and thus DOS and applications using BIOS calls won't be able to use them. The CTS utility Find_Com finds and writes them in the BIOS area, as shown in ***Figure 1:***

figure 1

```
Find_COM located the following serial ports:

Address   UART Type   Previous BIOS Setup   New BIOS Setup

3F8       16550A      Com1                  Com1
2F8       16550A      Com2                  Com2
3E8       16550A                            Com3
180       16550A                            Com4
```

I ran CTS's IRQInfo and Portinfo utilities, with the results shown in ***Figures 2 and 3, respectively.***

With the configuration confirmed and both printers working in DOS, I was ready for OS/2 (the only exception was MacMail, which did not work with the external modem, so I continued to use the SatisFAXtion—which is what backups are for).

For whether and how all this works in Warp, stay tuned.■

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figure 2

```
IRQInfo    Version 1.09a
Line Printer Port (LPT) Information

BIOS Assignment     Address     IRQ     Status

LPT1                3BC         7       Actual IRQ Detected
LPT2                378         ???     IRQ Not Detected
LPT3                278         5       Actual IRQ Detected

System Interrupt Table

IRQ  Standard/CommonUse        Used in This System               Available

0    System Timer              Yes - System Timer                Never
1    Keyboard                  Yes - Keyboard                    Never
2    2nd IRQ Controller        Yes - 2nd IRQ Controller          Never
3    Com2 (Serial Port)        Yes - Com2                        No-In Use
4    Com1 (Serial Port)        Yes - Com1                        No-In Use
5    LPT2/Sound Card/Modem     Yes - LPT3                        No-In Use
6    Floppy                    Yes - Floppy Disk Controller      No-In Use
7    LPT1/Sound Card           Yes - LPT1, (?) LPT2              Shared?
8    System Clock              Yes - RealTime System Clock       Never
9    Video/Add-in Card         * Nothing Detected                Yes
10   Add-in Card               DRIVER - $INTELFX                 No-In Use
11   Add-in Card               Yes - Com3                        No-In Use
12   PS2 Mouse/Add-in Card     Yes - Com4 (Mouse)                No-In Use
13   Numeric Coprocessor       Yes - Coprocessor Detected        No-In Use
14   Hard Drive Controller     Yes - Hard Drive Controller       No-In Use
15   Add-in Card               * Nothing Detected                Yes
```

figure 3

```
PortInfo   Professional Version 2.19a
Copyright 1993-94, Computer Telecommunication Systems, Inc. All Rights Reserved

Conflict Test for Port 1. PASSED
Conflict Test for Port 2. PASSED
Conflict Test for Port 3. PASSED
Conflict Test for Port 4. PASSED

                    | WARNING! |

Message PI-3100
This computer contains a display which conflicts with the use of the normal
Com4 serial port at address 2E8. The system may "lock up" if you try to
use a serial port at this address for communications. See the SPU User Guide
for additional information.

Checking Port 1.......Modem Detected...see summary screen for modem type...
Checking Port 2.......Modem Detected...see summary screen for modem type...
Checking Port 3......No Device Detected...
Checking Port 4......Serial Mouse Detected...

Internal Loopback Test for Port 1- PASSED
Internal Loopback Test for Port 2- PASSED
Internal Loopback Test for Port 3- PASSED
Internal Loopback Test for Port 4- PASSED

                        Serial1      Serial2      Serial3      Serial4

Port Address (Hex)      3F8          2F8          3E8          180
Interrupt (IRQ)         4            3            11           12
IRQ (Out2) Enabled      No           No           No           Yes

DOS uses port as        Com1         Com2         Com3         Com4
Device detected         FAX Modem    FAX Modem                 Mouse
FAX Service Class       0,2          0

Type of Port            16550A       16550A       16550A       16550A
Buffer - Trigger        Off          Off          Off          Off
Speed (BPS)             2400         2400         *Note 2*     9600
Bits / Character        8            8            5            7
Parity                  None         None         None         None
Stop Bits               1            1            1            1

Clear to Send           On           On           Off          On-RTS
Data Set Ready          On           On           Off          Off
Ring Indicator          Off          Off          Off          On-RTS
Data Carrier Detect     Off          Off          Off          On-RTS
Data Terminal Ready     Off          Off          Off          On
Request to Send         Off          Off          Off          On

Note 1: Po[illegible]o detected that you have a SERIAL mouse using IRQ 12
Note 2: This serial port data rate is not set to a standard value.
```

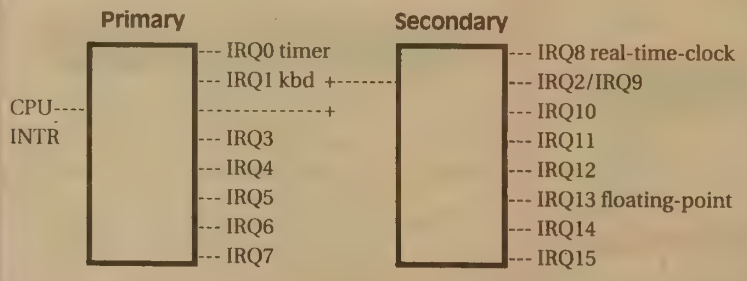
IRQs and PICs

The CPU has only one interrupt input, called INTR. In order to be able to handle interrupts from multiple sources, an external Programmable Interrupt Controller, or PIC, is used.

In the original IBM PC, a single 8259 PIC was used. The 8259 has eight inputs, which were connected to various sources of interrupts, and one output, which was connected to the CPU. The eight inputs were connected as follows:

0—timer
1—keyboard
2 thru 7—the bus interrupt lines IRQ2 thru IRQ7

When the AT was built, IBM decided that eight interrupts were not enough. A second 8259 was used, and it was connected to interrupt 2 on the first 8259. When two PICs are connected this way it is called cascading. The AT looked like:



In the AT, the bus line that in a PC was connected to IRQ2 is connected to IRQ9, although it is usually still labeled as IRQ2.

The fact that IRQ2 on the primary PIC is used to cascade to the secondary PIC is really of no interest or importance to most people. Virtually all cards that support IRQ2 will work fine in an AT and will not know or care that they are actually connected to the secondary PIC.

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- ☑ 14" Super VGA Color Monitor (1024x768) .28 NI
- ☑ 101 Keys Enhanced Keyboard
- ☑ Mini Tower Case w/ 230 Watts Power Supply
- ☑ 3 Button Serial Mouse

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Cyrix 486DX2-66	**$918**
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AMD 486DX2-66	**$958**
AMD 486DX4-100	**$1,038**
Intel 486DX2-66	**$978**
Intel 486DX4-100	**$1,178**

PACKAGE 2 SYSTEM

486 VLB Series

- ☑ SIS-471 Motherboard w/ CPU (256K Cache)
- ☑ 4Mb Ram installed (72-pin)
- ☑ IDE Controller VLB 2HD & 2FD w/ 2s, 1p, 1g
- ☑ Floppy Drive 1.44Mb
- ☑ Hard Disk 420Mb IDE 12ms
- ☑ **Spider+ Window Accelerator VLB w/1Mb**
- ☑ **14" Acer 34T SVGA Color Monitor (1024x768) .28 NI**
- ☑ 101 Keys Enhanced Keyboard
- ☑ Mini Tower Case w/ 230 Watts Power Supply
- ☑ 3 Button Serial Mouse

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Cyrix 486DX2-66	**$968**
AMD 486DX-40	**$978**
AMD 486DX2-66	**$998**
AMD 486DX4-100	**$1,078**
Intel 486DX2-66	**$1,028**
Intel 486DX4-100	**$1,218**

PACKAGE 3 SYSTEM

486 VLB Series

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- ☑ 4Mb RAM Installed (72-pin)
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- ☑ Floppy Drive 1.44Mb
- ☑ Hard Disk 420Mb IDE 12ms
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- ☑ **15" Acer 56L SVGA Color Monitor (1024x768) .28 NI**
- ☑ 101 Keys Enhanced Keyboard
- ☑ Mini Tower Case w/ 230 Watt Power Supply
- ☑ **Microsoft Serial Mouse**

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Intel 486DX4-100	**$1,358**

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- ☑ Floppy Drive 1.44Mb
- ☑ Hard Disk 420Mb IDE 12ms
- ☑ Windows Accelerator PCI w/ 1Mb
- ☑ 14" Super VGA Color Monitor (1024x768) .28 NI
- ☑ 101 Keys Enhanced Keyboard
- ☑ Mini Tower Case w/ 230 Watt Power Supply
- ☑ 3 Button Serial Mouse

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AMD 486DX2-66	**$998**
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- ☑ **15" Acer 56L SVGA Color Monitor (1024x768) .28 NI**
- ☑ Keytronic 101 Keys Enhanced Keyboard
- ☑ Medium Tower Case w/ 230 Watt Power Supply
- ☑ **Microsoft Serial Mouse**

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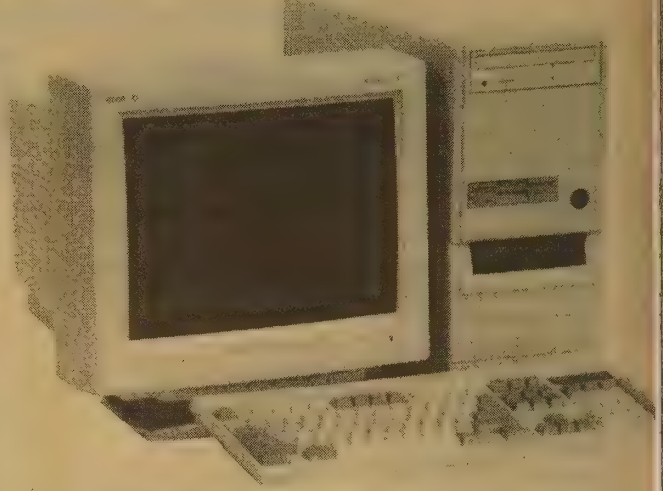

- ✱ SIS-471 Motherboard w/ CPU (ZIF socket)
- ✱ 256K Cache
- ✱ 4Mb Ram installed (72-pin)
- ✱ IDE Controller VLB 2HD & 2FD w/ 2s, 1p, 1g
- ✱ Floppy Drive 1.44Mb
- ✱ Hard Disk 420Mb IDE 12ms
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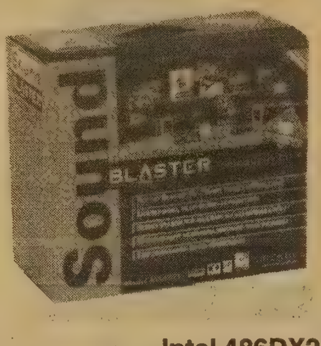

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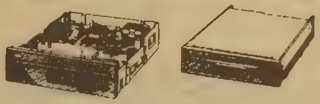

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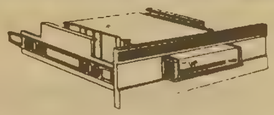

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The Point Of Floating

"If there were a point, of course, all this would be beside it."

If we're really lucky, the Pentium Bug Debacle is mostly behind us. The one good thing about the whole episode is that it provides an opportunity to think about the much misunderstood, oft-maligned notion of floating point numbers.

> These days, the decimal part of a floating point number is called the *significand*. It used to be called the *mantissa*, a word borrowed from the language of the Etruscans meaning "make weight." You can see immediately why people think floating point is weird.

When do people learn about fractions? Somewhere, I imagine, between age nine and age twelve, kids discover that there are some things that just can't be counted with integers alone. They learn to supplement the arithmetic of whole numbers by assembling integers into fractions. Gradually these "analog" fractions give way to decimal representation.

For the unsuspecting student of numbers, decimal fractions can be a shock. Some, like .5, .25, and even .1275, seem perfectly normal, but others are oddly disturbing. The fraction 2/3, for example, is intuitively satisfying, but its decimal equivalent strains credulity: a decimal point followed by an endless (yes, endless) stream of sixes. Just for clarity, that will be written as ".6666..." We learn quickly that some fractions (like 2/3) are elusive and have no exact decimal representation.

From these unruly fractions it's easy enough to find other numbers (like pi) that don't quite fit the decimal mold because their value is never finally determined. Exactitude, which was one of the charms of arithmetic in the first place, seems suddenly out of reach.

Rounding

Rather than throw out decimal numbers altogether, however, we agree to do the sensible thing. In the interest of usefulness, we agree to tolerate some inaccuracy. Faced with a number that has no usable decimal representation, we adjust it to some nearby number that *can* be represented, and hence used.

Every school child knows that this is called "rounding." In the case of 2/3, depending on the degree of precision needed, the endless stream of sixes following the decimal point is truncated to as many sixes as are needed followed by a seven: .67, .667, .6667, etc.

In rounding, there are a few common assumptions about what makes one number a suitable substitute for another. We usually round to the nearest number. An "unrepresentable" number is usually rounded to the nearest number that can be represented exactly. The number .6666..., for example, rounds to .667; rounding it to .668 introduces more inaccuracy than necessary and is usually considered an error.

We also expect the "rounded" number to have adequate precision (digits to the right of the decimal) for the calculation being performed. Rounding .6666... to .7 is pointless if precision to the nearest hundredth is needed. In rounding, we usually specify what the "units in last place" (ulps) should be: Round to the nearest hundredth (hundredth is the unit in last place).

We also assume that the degree of accuracy lost in rounding an unrepresentable number can be measured by subtracting the number we can't represent from the rounded number. This operation would produce another unrepresentable number, so we can only approximate the lost degree of accuracy.

The things we know about rounding and about how numbers are represented apply regardless of how the calculations are done. The decimal representation of 2/3 is no less difficult for a computer than it is for a sixth-grader with a No. 2 pencil and a piece of paper.

Computers, Sixth Graders, And Floating Points

For doing problems in arithmetic, the big difference between a computer and a sixth grader is that the computer does all its work with numbers in memory locations that are fixed in size. When a computer adds two integers, for example, the result must fit in a relatively small number of bits (these days 32 or 64 bits, depending on the computer). The computer can't just keep appending bits to this memory location to accommodate larger numbers. On the other hand, a patient sixth grader with a lot of paper can build some very large numbers by just appending digits.

This is where the difference between fixed and floating point numbers begins to be useful.

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Sixth graders and other human beings usually work with "fixed point" numbers. A fixed point number is a single string of digits in which the size of a number is determined by its position. To make a number bigger, you simply add positions to the left of the decimal; to make a number smaller, add positions to the right of the decimal. Think for a moment about how you understand the following fixed point numbers: 1, 10, 1000, .01, .001.

From these unruly fractions it's easy enough to find other numbers (like pi) that don't quite fit the decimal mold because their value is never finally determined. Exactitude, which was one of the charms of arithmetic in the first place, seems suddenly out of reach.

The trouble with fixed point is the number of positions that are needed to represent very large or very small numbers. The closer your number is to infinity, the more space it requires.

Floating point, on the other hand, is a way of formatting numbers efficiently in a limited space. Floating point is not magic: The space available for the computer to do arithmetic is still finite and the set of numbers to work with is still infinite. Using floating point notation, however, a computer can use this finite space to represent a much wider range of numbers (both large and small) than fixed point notation would allow.

The floating point format breaks a number up into two parts: a decimal portion and a base portion. Floating point numbers can be written like this:

1.00 x 10^-1

1.00 is the decimal part, and 10^-1 (that is, 10 raised to the -1 power) is the base part. The decimal portion of a floating point number is like a fixed point number except that it has a fixed number of digits (in the example above, three). It's called the decimal part because it contains a decimal point that tells us about any fractional units that are a part of the number.

These days, the decimal part of a floating point number is called the *significand.* It used to be called the *mantissa*, a word borrowed from the language of the Etruscans meaning "make weight." You can see immediately why people think floating point is weird.

In the example above, the decimal part is a "base 10" number. This is not necessarily the case for all floating point numbers, and that brings us to the role of the "base" part.

The "base" part of a floating point number

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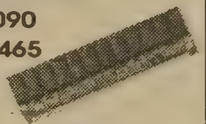

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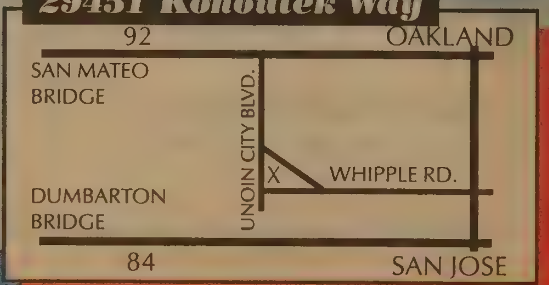

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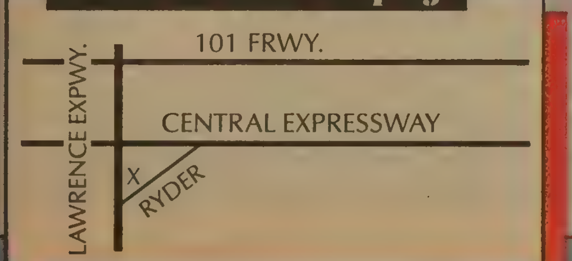

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UNIX *continued from page 74*

is called the "base part" and it consists of a whole number (it should be an even number) that gives the number base of the decimal part.

The decimal part can be a number in any legitimate number base. The example above shows a floating point number using base 10, but we could also have used base 2 or base 16 or any other number base.

The base part of a floating point number includes an exponent that establishes the magnitude of the floating point number. The value of a floating point number is the product of multiplying the decimal part by the base part.

A lot of people have problems with the exponent thing, but it's the key to making the point float. The floating point number 1.00 x 10^-1 represents .1 in fixed point. Increasing the exponent makes the number bigger, and has the same effect as adding places to the left of the decimal point:

1.00 x 10^0 represents the fixed point number 1
1.00 x 10^1 represents the fixed point number 10
1.00 x 10^2 represents the fixed point number 100

Decreasing the exponent makes the number smaller and has the same effect as adding places to the right of the decimal point: 1.00 x 10^-2 represents .01 and so on.

> The things we know about rounding and about how numbers are represented apply regardless of how the calculations are done. The decimal representation of 2/3 is no less difficult for a computer than it is for a sixth-grader with a No. 2 pencil and a piece of paper.

Floating point notation really depends on two variables: the number base and the precision (that is, number of digits allowed) of the decimal portion. Someone designing a floating point system makes the decision about number base and precision at the outset.

Computers And Floating Point

In the examples so far, we've used a number base of 10 and three digits in the decimal part. These values make for examples that people can read easily. They're not particularly realistic for computer systems. Two standards for floating point numbers have been adopted by the IEEE (The Institute of Electrical and Electronics Engineers) recommending that base be either 10 (convenient for humans) or 2 (convenient for computers) and that precision be 24 bits.

Formatting numbers in floating point simplifies their storage requirements dramatically. The computer needs to allocate space only for the decimal part of the number and for the exponent portion of the base. The size of the decimal part is fixed, and the exponent uses the space required for a signed integer. Floating point numbers have constant storage requirements.

As with fixed point representations of decimal fractions, there are some numbers that cannot be represented exactly in floating point format. When floating point cannot represent some number exactly, it is usually for the same reason that numbers like 2/3 can't be exactly represented in fixed point notation: trying to compute the value

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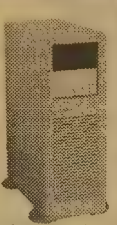

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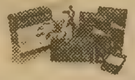

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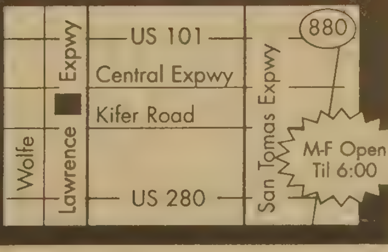

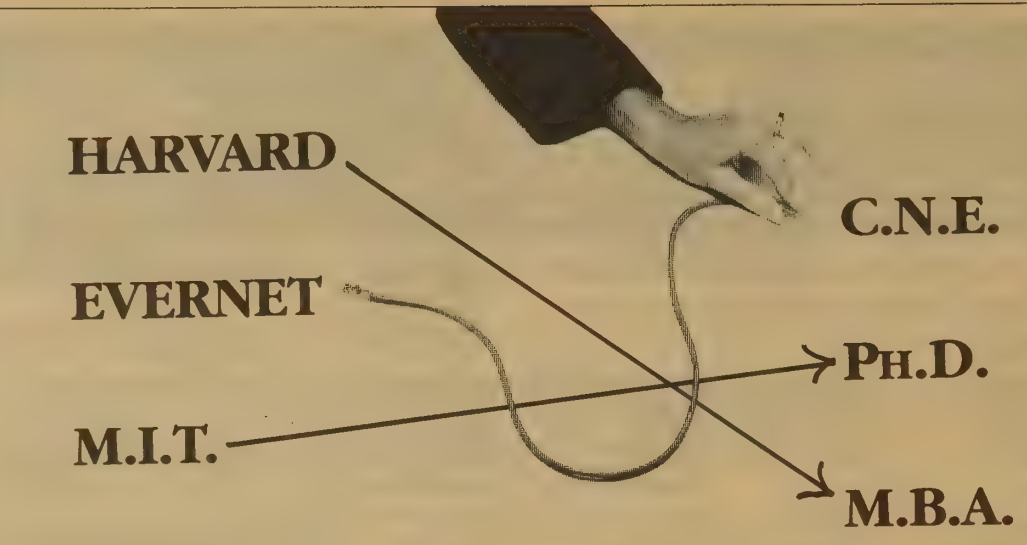
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of the number results in a sequence of numbers that repeats infinitely.

When this sort of thing occurs in fixed point notation, it is usually pretty obvious what's happening, and when the problem is resolved by rounding, that, too, is easily understood.

With floating point notation, things are less straightforward: A number that can be represented perfectly well in base 10 may produce an infinite repeating pattern in base 2. For example, the fixed point number .1 can't be represented exactly in floating point if base 2 is used. The sensible thing is to round this inexact floating point representation to the nearest floating point number (something like 1.10011001100110011001101 x 2^-4). When this in turn gets converted back to fixed point representation, its relationship to .1 may be difficult to discern.

There is, however, a big difference between "difficult to discern" and inaccurate. Floating point numbers are no more inherently inaccurate than fixed point numbers, and while they introduce some complications, they also behave in rational ways.

What We've Learned

If there is any lesson to be learned from the Pentium Floating Point fiasco, it is a philosophical one: We may be compelled by circumstances to work with approximations of what's real, but it's a mistake to pretend that the approximations have come untethered from the elusive things they represent.

If you want to cultivate a deeper understanding of floating point numbers (or if you're just curious about how real computer scientists think), see "What Every Computer Scientist Should Know About Floating Point Arithmetic" by David Goldberg in *ACM Computing Surveys*, vol. 23, no. 1, March 1991. It's not an article for general audiences, but it does demonstrate that "it is possible to reason rigorously about floating point."

If you really want to wallow in the technical details of the Pentium's floating point problems, read the *comp.sys.intel* newsgroup. Recent postings to this group are an interesting mix of technical detail, righteous indignation, and earnest pursuit of truth.

Finally, the quote at the beginning of this article is something I heard or read some twenty-five years ago. I'm convinced it was in Tom Stoppard's play *Rosencrantz and Guildenstern Are Dead*, but I haven't located it in my copy of the play or in the movie. If you know the source of this line, please let me know via email (*bkf@netcom.com*). ■

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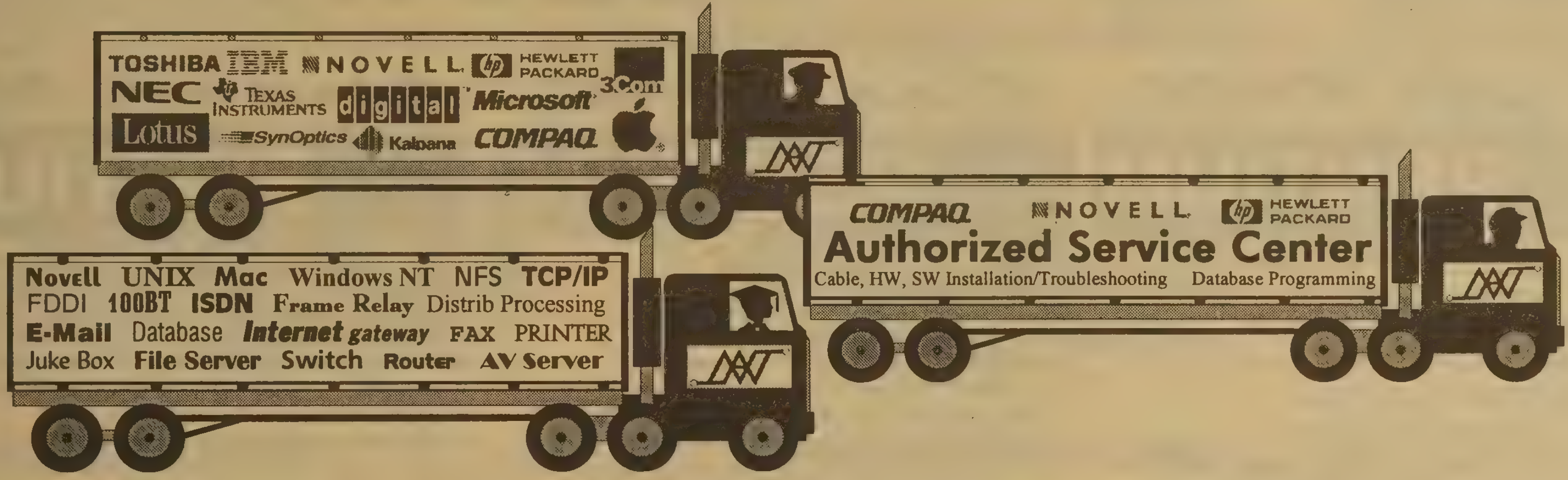
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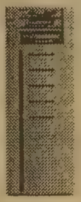

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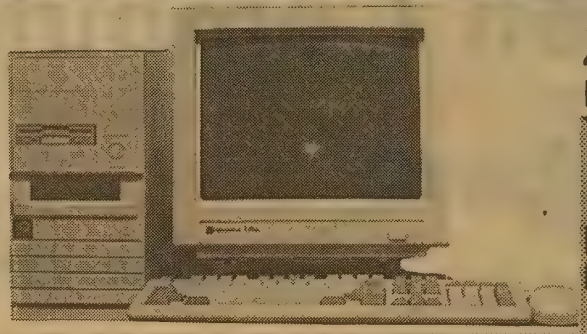

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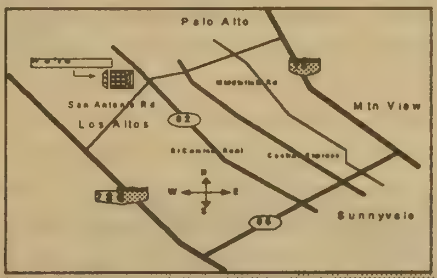

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Should You Form A Limited Liability Company?

What Every Computer Professional Needs To Know About LLCs

There's a new form of business in the State of California. Enactment late last year of the Beverly-Killea Limited Liability Company Act created the most important development in the business formation arena in many years.

Independent computer programmers, software developers, and technical professionals weighing the pros and cons of incorporating can now also wrestle with the pluses and minuses of forming a limited liability company (LLC).

Think of an LLC as a cross between a corporation and a partnership. A California LLC can provide limited insulation from liability, to the same extent as a corporation. Unlike corporations, however, LLCs can presumably be structured as partnerships for federal income tax purposes. And, of particular interest to your venture capitalists, the LLC gives its members the options of participating directly in the management of the business or designating certain members or nonmembers as managers.

Who Should Consider It?

Not everyone can form an LLC. For various reasons, mostly political, professional practices that are subject to licensing under the California Business and Professional Code cannot yet form California LLCs. This eliminates doctors, lawyers, and the like. You can probably thank the trial attorneys' lobby for that one. Fortunately, no one needs a license to write code, so for software developers, programmers, technical writers, and various other computer professionals, LLCs remain an option. Licensed engineers such as civil engineers and architects, however, cannot organize an LLC in California.

A minimum of two partners are required to form a partnership, and the new law similarly requires that an LLC have two or more members. Just you going it alone doesn't qualify. On the other hand, a spouse or other relative may be counted as a member, so it's easy enough to circumvent this restriction (some states do allow an LLC to have only one member, but not California).

To evaluate the potential benefits of an LLC for your situation, it makes sense to compare the option with a regular corporation, an "S corporation," a limited partnership, or simply remaining unincorporated—either as a partnership, an independent contractor, or as an employee.

Compared To Traditional Corporations

Unlike regular corporations, LLCs are generally subject to no federal income tax. Also, profits and losses can be allocated with greater flexibility. If you contribute your services in exchange for a profits interest, the transaction typically won't be taxable, as it would in a corporation. And unlike a corporation, if you develop computer software and write off the development costs when incurred, you won't be subject to a corporate level tax on the software's fair market value when the business liquidates. (For more information on corporate tax planning for developers and programmers, see below.)

It may be an overgeneralization, but contract techies tend to be remiss in keeping up with corporate formalities such as maintaining the minutes book, adopting resolutions, and holding annual meetings. Laxity in this area creates the risk that the IRS or the courts will refuse to recognize the corporate existence. The LLC Act provides for relatively few corporate formalities requiring one's periodic attention. That's an advantage for those technical folk for whom the business side of things presents a chore.

Computer consultants often incorporate or work under less advantageous terms through a hiring agency, because their clients refuse to engage the services of unincorporated individuals, largely due to a host of employment-related tax issues. The primary concern is that a worker purporting to be an independent contractor may later be reclassified as an employee.

> The primary advantage of an LLC over a **partnership** is the lack of personal **liability** of the owners.

Because big industry in California contributes less to the state unemployment insurance fund than its employees draw in benefits, the Economic Development Department (EDD) is under enormous pressure to reclassify would-be independent contractors as employees, to keep that unemployment insurance fund in the black. The IRS also takes a bite when a worker is reclassified, since the deductibility of business expenses is restricted. Technical independent contractors are easy prey to this revenue siphon because employment taxes are imposed anew with each job, and due to their professional disincentive to be idle long enough to go on the dole.

Between the IRS and the EDD, this employee status stuff can make you want

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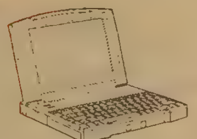

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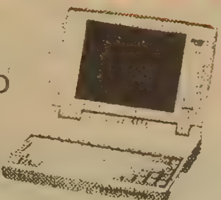

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An LLC provides a partial shield against such misfortune, because an LLC is taxed like a partnership. Each partner is generally considered self-employed. Since the EDD does not consider self-employment income to be wages, distributions to partners generally aren't subject to unemployment taxes. (For more information on employment taxes and technical workers, see endbar.)

Compared To S Corporations

S corporations, like LLCs, are generally taxed like partnerships but enjoy the limited liability of a corporation. They are subject, however, to a host of burdensome restrictions that LLCs escape. S corporations may have a maximum of thirty-five shareholders, but an LLC may have an unlimited number of members. Even if that isn't currently an issue, if you sell your business to a venture capitalist the difference can be important.

S corporations can have only one class of stock, and income and losses must be allocated among the shareholders pro rata. LLCs are more flexible. Within certain bounds, you can arrange how the profits and losses are divied up.

Unlike LLCs, only individuals, estates, and certain trusts may be shareholders of S corporations. Other advantages have to do with the deductibility of losses and the tax treatment of property that the members contribute to the LLC. By comparison, S corporations are a minefield of tax traps that can ultimately result in disqualification of S status. Once an LLC is up and running, you're far less likely to blow it big.

LLCs are especially likely to be favored by Silicon Valley venture capitalists. Generally, venture capitalists want to be taxed like a partnership, both to avoid corporate double taxation and to allow risky venture losses to flow through to the owners. They also prefer to retain limited liability and control over management decisions. LLCs let venture capitalists have all this.

Compared To Partnerships

The primary advantage of an LLC over a partnership is the lack of personal liability of the owners. Limited liability means that the owners can't be held personally responsible for claims against the business. Limited partners in a limited partnership enjoy similar insulation, but there must be at least one general partner with personal liability. Relatively high administrative costs of limited partnerships also discourage their use.

LLCs provide more flexibility in the management of the business than do partnerships. If they so choose, all the members can have a say in running things. Alternatively, the members may designate managers. Unlike partnerships, managers are not required to be members.

But limited liability companies are no panacea. Some technical professionals are better off getting taxed as corporations. For one thing, many small corporations can accumulate earnings at income tax rates as

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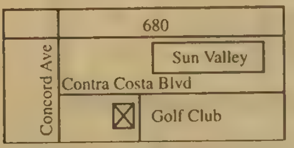

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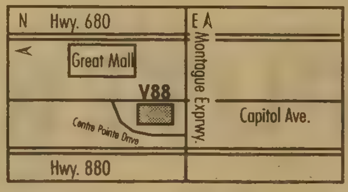

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Why Not An LLC?

Many factors may convince independent technical consultants or service providers to forego an LLC, despite its desirabilities. Administrative costs of forming and operating one tend to be more than for a corporation, largely due to legal fees.

> Generally, **venture capitalists** want to be taxed like a partnership, both to avoid corporate double taxation and to allow **risky** venture **losses** to flow through to the owners.

In some states, any LLC formed in accordance with that state's statute is practically guaranteed partnership treatment. Their drawback is a lack of flexibility in drafting the operating agreement. California, on the other hand, provides so much flexibility that an LLC formed here might be taxed as a corporation or a partnership, depending upon how the operating agreement is drafted. To be taxed as a partnership, the operating agreement should avoid adopting more corporate characteristics than partnership characteristics.

Consider, for example, Numlach and Scroll, who form a California LLC. They both share management responsibilities equally, rather than designating either one as the manager (i.e., avoiding centralized management); and both agree that they won't transfer their interests without the other's written consent (avoiding free transferability of interests). These provisions, together, should be sufficient to prevent the LLC from accumulating a preponderance of corporate characteristics, permitting it to be taxed as a partnership.

California does impose a minimum $800 tax on LLCs to make up for revenues the state would lose if corporations and limited partnerships convert to LLC status. In addition, there is a graduated franchise fee. At the low end of the ladder, those fees will be:

Reportable Gross Income	1995 Fee Amount
0 to $250,000	None
$250,000 to $500,000	$500
$500,000 to $1 million	$1500

The minimum franchise tax, plus franchise, attorney, and accountant fees, can add up.

As noted above, a primary advantage of an LLC is the lack of personal liability of the owners. But for small, independent technical professionals, this benefit can be illusory.

continued on page 156

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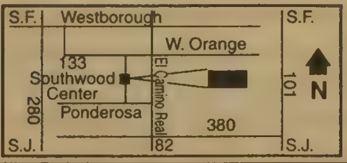

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Space And Beauty

Optimizing The Home Office

People ask me whether hardware or software is more important in their home office. The answer is "neither," of course. What is most important is you, the user; what makes you comfortable and productive at home is always the key business issue. I have found that the kind of space I work in determines how much I can do, and how well.

This is more than neatness. Articles about workspace tidiness tend to preach to the converted, making perfect sense to people who are naturally tidy. These folks always pick up after themselves. They wash their coffee cups. They put quarterly reports in file folders, put the file folders away, and (bless them!) have organized file cabinets to put them in.

But I'm Not A Tidy Sort...

Those of us who really need this information are *not* naturally tidy. In its native state, my desk is a heap. It awaits future researchers (I try to keep a positive outlook—"I am not a mess-maker; I am a resource for archeologists.")

But I am also a lazy man. Over the years I've found that my chaotic space was making it hard for me to get anything done. The easy way, in fact, was to create an area that supported work.

"Space and Beauty" has become my slogan. The object is to make a space with room to work, and make it so attractive that we are drawn into it.

A Room Of One's Own...

When you create an office in your own home, the temptation is to "just use the kitchen table." It doesn't work. When you work in someone else's office, they provide a dedicated workspace. When you rent an office and furnish it for business, you also acquire the dedication.

When you work at home, it is always too easy to slide from "work" mode to "home" mode. The problem turns out not to be one of hardware or software, but of space. To use your equipment well at home, you need to create and defend "A Room of Your Own."

You can do this by separating. This is the same process by which space is purified for a religious observance. One dedicates the space by removing everything other than what belongs there. When Passover time comes in an observant Jewish household, family members search for yeast-raised bread; and it is all removed. Thus the house is made clean for Pesach. When you are building a home office, the first object is to remove things that will be in the way.

Are you a book or television critic? If not, the television and entertaining books do not belong in the office. The mail does not go in the office (unless it is business mail). Birthday gifts are not hidden there. The object is to make a space that will support your work, and that will discourage distractions.

There is a simple test, really. Look at everything in the workspace and ask, "Does this directly support doing the job?" If not, it goes.

An office dedicated to work has an additional benefit: what is not in the office is not work. The separate workspace serves not only your professional life, but your family life as well. You can leave your home office, close the door, and be at home in the rest of your house.

The Compromises

The ideal is to have a space that is entirely yours. The best room is a small mountain cabin, with no neighbors for several miles. No spouse, no pets, no children, and a phone that only makes outgoing calls. The goal is that you will be alone with your work.

> **"Space and Beauty"** has become my slogan. The object is to make a space with room to work, and make it so attractive that we are drawn into it.

The average home office is a webwork of compromises. There is no room available in the house, so you use half of a room and try to ignore the goings-on in the other half. The cat wants contact. When you won't let her sit on your lap, she sits on the printer and sheds into it. Children know that a parent at home is at their service.

So how do you optimize your chances of making a space where you can get some work done? Here are some rules of thumb: If you can get a room with a door that closes, take it! If your job is worth doing at home, it is worth a dedicated room. A room wholly dedicated to income-producing work will be a much more defensible deduction at tax time.

If you know how you get distracted, choose your office to avoid those distractions. I have found that sounds will always catch my attention. In a small house, it is hard to avoid outside noises, but I have my workspace in the quietest part of the house. A person who follows their nose to any good smell should try to move their office away from the kitchen.

Placing Things In The Office

If you follow all these suggestions, you will have a very bare room. Everything that belongs elsewhere has been removed, down to the last protesting cat. Now you want to make an actively work-supporting environment.

What things *do* belong in the workspace, and where should those things be? "Ease and Beauty" would be my answer. The object is to make an environment that is attractive, so that you want to go into it; and easy to work in. Ten years of writing at home has given me these ideas:

continued on page 94

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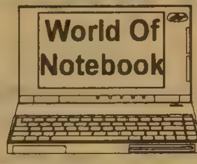

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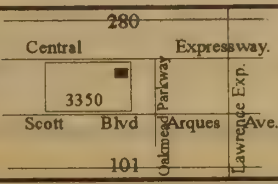

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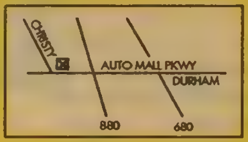

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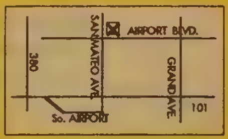

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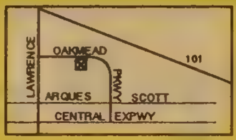

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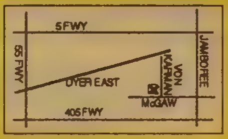

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Business Solutions

Small Office/Home Office

continued from page 90

•Your primary tool should be straight ahead of you. For many of us, that is the computer. The computer should be straight ahead, then, and the keyboard should be comfortably placed. Is what you need in front of you? If not, rearrange until it is. The test is simple: When you sit down, is it so easy to start working that you just do?

•Resources should be beside you. Do you need certain paper files every few minutes? They should be right beside you, so you can reach out and grab them without looking. Disks you use daily should be there. Your coffee cup and your telephone should be within reach. They are to the side, because they are resources rather than your task itself, but accessible.

•If your primary tool is straight ahead, and resources are to your left and right, what lies at those 45-degree angles where we stare in search of inspiration? I find that "Inspiration" is the answer: When we need to look away from our work and grab a moment's nourishment for the soul, it should be available. If it is not, we will get up and abandon what we are doing. Put the pictures of the family here, the mountain-flowers poster or the photograph of Strongheart. One Buddhist writer I know keeps a small shrine there.

These rule of thumb for home office layout—work straight ahead, resources beside you, inspiration at 45 degrees—create a workspace that encourages you at your task. When you sit down, all you see is the job to do and inspiration to do it. Everything you need is at hand.

Containers As A Way Of Thinking

Having the "filing by piling" temperament, I find it difficult to keep things ordered. Yet if anything saves time and avoids annoyance, it is a filing system that serves your needs.

This does not mean a filing system that would satisfy your most compulsive friend. It means that things are easy to find when you want them, and out of the way when you don't want them.

This is how I finally got my desk cleared off. Each major project has its own files. If I find that I don't have a file for a new project, I create one immediately. Then useful information gets saved instead of discarded, and I can find it later. Because much of my work deals with books, I have a "current" bookrack right beside me. The books I am reviewing, or using as references for articles,

continued on page 155

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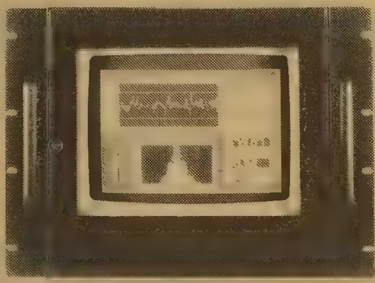

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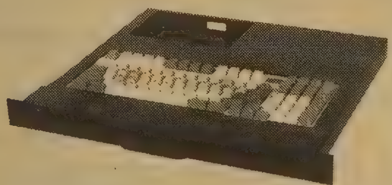

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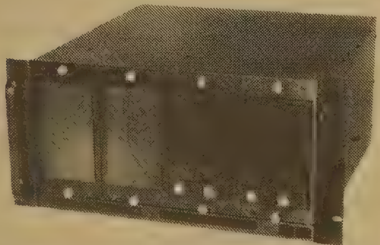

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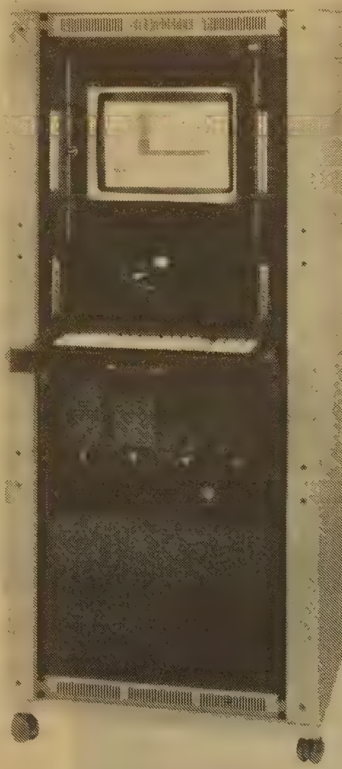

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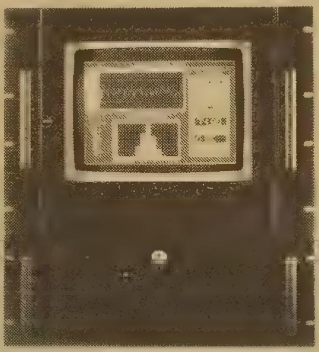

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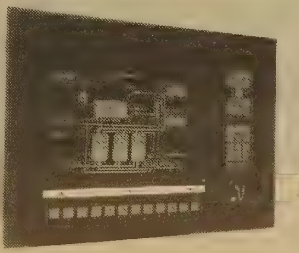

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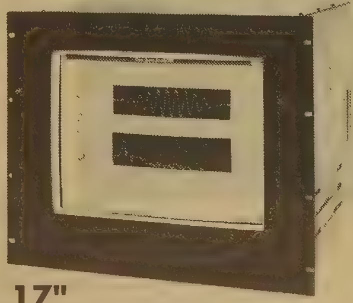

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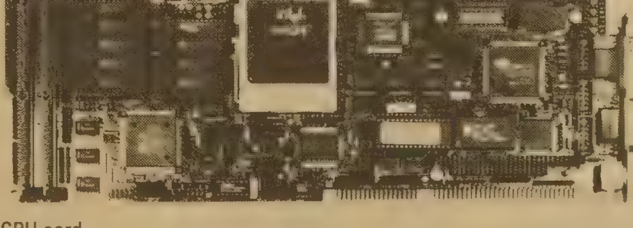

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From time to time, I have referred to so-called "intentional communities" of people who gather in one place to do business along the Internet.

We all understand that, with telecommuting helping to eliminate the obstacles normally associated with physical distance, it's natural for people to cluster together electronically, using the Internet and other pathways to maintain virtual contact as though they were neighbors. What piques my interest even more, however, is why such people would then want to move their homes and families, offices and workshops, so they are physically near each other, as well.

> **"Teleworking Partners"** are companies that do not have an office in the **software park**, but like to be considered one of the members of the **community**.

In previous discussions, I've referred to several of these intentional communities. For example, people are moving to Canby, Oregon, where the city is wired with fiber optic, and where local utilities and other government agencies are emphasizing telecommunications-based activities. In upper Sonoma County, around Petaluma, California, a community of network-connected health care experts is forming. These people want to get away from urban blight and traffic, but want to be near people with similar professions and interests. In Telluride, Colorado, there is a group of people interested in networking and a good deal of infrastructure—T-1 lines and fiber optics, for example—although the community has not yet focused on any one specialty.

I recently received information from sources in and around Linz, Austria, about a new community being formed, the Hagenberg Software Park. About twenty companies and five research institutes are currently involved in the community, loosely organized around the University of Linz. Although all of the organizations are pursuing some aspect of software development, each has developed a niche of its own, such as "technical" software, "marketing" software, and "office automation" software.

The first companies moved into the software park in 1991. At this time two companies (Uni Software Plus and Softwarehouse Europe) already had an office in town, and simply moved to the new location.

Among other companies to join in the earliest stages of Hagenberg's growth have been Siemens, Art & Technology, Phi-Tech (which has since moved out), Mayreder Consult, and GCL.

Here is a brief listing of current members of Hagenberg Software Park, and their specialities:

AMS/STIWA—Software development for CIM, production planning.
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FHS—Software engineering.
FLLL (Fuzzy Logic Laboratorium Linz)—Fuzzy logic, fuzzy control, industrial applications.
GCL—Software and technologies for tunnel construction.
GENESIS—Center for security, cryptography.
GOS—Software for geometric problems.
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SAT—Research center for automation techniques.

SYSTEMS TECHNIQUES & AUTOMATION—Research center for systems design and automation, systems engineering, software technology, flexible manufacturing, CASE-environments.

SIEMENS PSE—Software development group of Siemens, environmental technologies, scientific software, communication technologies, automation, traffic engineering, technological service.

SOFT WAREHOUSE Europe—Marketing of computer algebra system Derive, software for mathematics education.

UNI SOFTWARE PLUS—Computer mathematics, symbolic computation, software engineering, soft automation; products, projects, training.

UNSELD + PARTNER—Discrete simulation.

WESELY, Mag. Raimund—Designer.

For most companies and institutes, the main reason to move into the Hagenberg Software Park is to join a group of highly trained experts all pursuing research and activities centering around software. Members of the group expect and find a certain atmosphere in which one can discuss problems and ideas with a receptive, knowledgeable audience of people.

Being with a group of other software experts also makes cooperative and consultative projects relatively easy to undertake. In addition, highly trained programming and software engineering students are available from the different institutes.

There are other advantages, too, such as sharing a common pool of highly advanced infrastructure, which includes everything from specialized telephone services to electronic classrooms. These people are in regular—and sometimes hourly—touch with each other through email, shared files, and other forms of electronic cooperation. Even though they often pursue individual or small-group projects, they constantly feel themselves to be a part of a larger, like-minded community. And, of course, all the resources of such a community are readily available to them, not only online, but within a short walking distance.

Not everything is perfect, of course. At present, Hagenberg is somewhat short of hotels, shops, and other places for people to gather and enjoy themselves. However, members of the community are cheerfully working to overcome these problems, and future growth within the Hagenberg community will naturally encourage more hotels and shops to open there.

Hagenberg community members expect the community to expand in the future as new members are attracted by the area's present facilities and knowledge environment, as well as by booths at important exhibitions, workshops, and seminars which are jointly sponsored by the community's present members.

Visitors are welcome, and those interested can contact the Hagenberg Software Park via any of the organizations based there. There is no established "acceptance" or application process. To become a member of the community, one merely has to rent an office within community boundaries, or join with one of them via telecommuting.

Telecommuting schedules should be individually tailored to provide a **satisfying balance** of time spent at the telecenter and the main office.

So-called "Teleworking Partners" are companies that do not have an office in the software park, but like to be considered one of the members of the community. Many small enterprises, not yet at the stage where they can afford an office at Hagenberg, are "joining" this way at first.

So far, only three companies have left the community: two because they were very small and eventually went out of business; a third because it found the community too small and too remote from other population centers.

For more information about the Hagenberg Software Park, contact Maria Kreindl or Anita Zwettler, information secretaries, by telephone (07236)3343-55, or fax (07236)3769. (These are local numbers only. Contact your international operator for prefix numbers to dial.)

(For their help in preparing this report, many thanks to Austrians Sabine Stifter—*Sabine.Stifter@risc.uni-linz.ac.at*—and Christian Leeb—*Christian.leeb@imc.imc.umi-at.at*—who are actively involved with the Hagenberg Software Park.)

US Government Recognizes Impact Of "Doing It"

Although the favorable and unfavorable impact of telecommuting on those doing it—or working with those doing it—has long been discussed among consultants and telecommuters in the field, it's refreshing and exciting to see the US government also getting the message. In fact, the feds are ramping up a major telecommuting conversion effort, dubbed "Flexiplace," which we have previously discussed in this space. Through the broadening acceptance and success of Flexiplace, your federal government is now en route to becoming the largest employer of telecommuters in the US and the world.

Not only are agencies of your government creating a climate in which telecommuting is a more common and acceptable method of accomplishing work, they are training tens of thousands of workers to succeed as telecommuters. And they are also producing training materials that private companies can easily and freely adapt and use for their own telecommuting programs. Small companies, in particular, should take a look at available government documents and see about utilizing them to help make telecommuting more feasible in their own organizations.

Along these lines, and as a sample of what you can expect from your government's "Flexiplace" materials, here is an excerpted and edited version of what one government training manual has to say on the potential impact of telecommuting.

Impact On The Telecommuter: Telecommuting offers numerous benefits, including reduced stress and enhanced quality of worklife. It also raises concerns, such as the telecommuter's isolation from coworkers. Some telecommuters report some initial feelings of loss of professional identity as well as self-esteem (ironically, because they missed the spontaneous

continued on page 163

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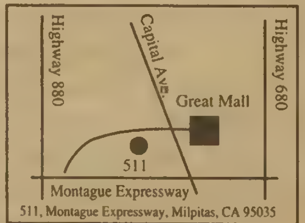

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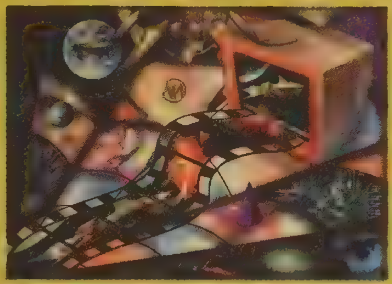

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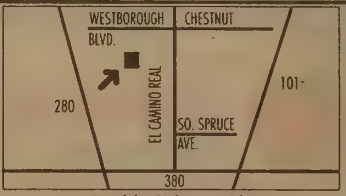

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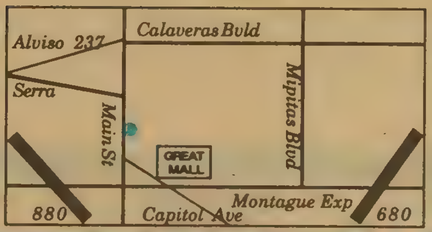

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486DX4-100/256K VLB (Intel)	$1065
486 DX2-66/256K VLB (Intel)	$878
486 DX-33/256K VLB (Intel)	$824
486 SX-25C VLB (Intel)	$750
486 DX4-100/256K PCI (AMD)	$956
486 DX4-100/256K VLB (AMD)	$931
486DX2-80/256K VLB (AMD)	$876
486DX2-66/256K VLB (AMD)	$866
Micronics 486 DX2-66/256K VLB (Intel)	$898

UPGRADE OPTIONS

[illegible]

[illegible] Localbus	10
[illegible]se	20

SPECIAL OF THE MONTH

MICRONICS SYSTEMS

486/256K Micronics MB
486DX2-66 Intel CPU
8MB RAM 72 pin
IDE VLB on board
ATI Mach 32 VLB w/2MB
15" Non-int. Monitor
420MB Hard Drive
1.2 & 1.44 TEAC FD
Mini Tower Case
101 Keyboard
Mouse & Mouse pad

$1200

MULTIMEDIA

CREATIVE LABS	
Sound Blaster Version 2.0	$60
Sound Blaster 16 Value Edition OEM	79
SoundBlaster Pro 16 MCD OEM/MCD w/ASP Orig.	87/160
SoundBlaster 16 SCSI-II OEM/ SCSI II w/ASP Orig	110/197
SoundBlaster AWE 32	260
MITSUMI	
Double speed CD ROM	120
Quadruple speed CD ROM 4xi	190
PANASONIC CD ROM Double Speed w/card	120
TOSHIBA CD ROM Quadruple Speed 3501	290
TEAC CD ROM Quadruple Speed	220
Impression 2xi Multimedia Kit: Panasonic double-speed + Soundblaster 16 5 Microsoft *Home* software + Speakers	255
Impression 4xi Multimedia Kit: Teac quadruple-speed + Soundblaster 16 5 Microsoft *Home* software + Speakers	375
Soundblaster Discovery CD 16 Panasonic double speed CDROM SoundBlaster Pro 16 + 15 CD Titles, MIC, Spkrs.	245

KEYBOARD

101 Enhanced keyboard	$18
Maxiswitch/Keytronics	26/29
Focus 2001/7000/8000/9000	35/47/35/50
Omnikey 101	65

HARD DRIVES

CONNER	
420 mb/14ms (IDE)	175
1.2 GB/14ms (IDE)	465
1.0 GB/10ms (SCSI-2)	490
MAXTOR	
420mb/12ms (IDE)	180
540mb/14ms (IDE)	215
345mb/14ms (SCSI)	178
QUANTUM	
540mb/14ms (IDE)	210
54mb/11ms LT540AT (IDE)	225
540mb/14ms (SCSI)	230
730mb/12ms (IDE)	280
1.4 GB/8.9ms (SCSI-3)	740
2.1 GB/9.5ms (SCSI-3)	885
WESTERN DIGITAL	
420mb/13ms (IDE)	178
540mb/12ms (IDE)	220
730mb/10ms (IDE)	300
1.0 GB/10ms (IDE)	420

CONTROLLER CARDS

IDE W/ I/O	14
I/O with 2s/1p/1g	12
IDE VESA Local Bus / w/16550	20/40
PCI IDE/PCI SCSI-2 Controller	38/119
Adaptec SCSI 1522	72
Adaptec SCSI 1542CF/1542CF w/Kit	168/239
Adaptec EISA SCSI 2742T/2742T w/Kit	225/350
Adaptec SCSI PCI 2940 w/Kit OEM/ 2940W	200/270
Adaptec SCSI 2842A-VL OEM	210

MISCELLANEOUS

ZOLTRIX	
Fax Modem (96 F, 24 M)/Win	$39
Fax Modem (14400 F, 14400 M) Int / Ext	60/85
Fax Modem (28,800 Baud)	113
US Robotics Fax/Modem 14,400	99
US Robotics Fax/Modem 28,800 v.34	228
Microsoft mouse serial/bus	26/53
Logitech Mouseman serial/Bus (4000dpi)	30/51
COLORADO	
Tape backup DJ-20 250MB/DJ-35C 340MB	153/175
Trakker 250MB/Trakker 680MB	295/475
Baby AT/Mini Tower case w/230W PS	40
Medium Tower case w/230W PS	61
Full Tower case w/250W PS	80
Dual Floppy Drive 1.2+1.4MB	99
TEAC 1.2FD/1.44FD	42/38

PRINTERS

HP DeskJet 540/560C	300/499
HP DeskJet 1200C/1200C Postscript	1324/1929
HP 4P/HP IV Plus/4MP	959/1379/1330
HP 4ML/4L/4M Plus	989/649/1900

VIDEO CARDS

TRIDENT	
SVGA-512/1MB (1024x768,16bit)	$38/58
DIAMOND	
Stealth 24 VLB w/1MB DRAM	129
Viper SE PCI w/2MB	255
Stealth 64 VLB/PCI w/1MB/2MB DRAM	135/185
Stealth 64 VLB/PCI w/2MB/4MB	280/420
SPIDER	
Tarantula PCI w/2MB/4MB	245/360
32VESA Local Bus w/1MB/2MB	83/133
32VLB Plus w/1MB/2MB	92/140
BlackWidow Engine ISA 1M/2M	125/175
BlackWidow+ PCI/VLB w/1MB/2MB	150/210
256 Cache VLB w/1MB/2MB	99/150
64 VLB/PCI w1MB/2MB/4MB	112/167/277
Pro VLB SVGA VIDEO w/IDE/I/O	94
ORCHID	
Kelvin VLB/PCI w/1MB/2MB DRAM	138/177
Kelvin Easy VLB/PCI w/ 1MB	105
Fahrenheit PRO VLB/PCI 2M/4M VRAM	275/405
ATI	
ATI Ultra Pro Mach 32 VLB/PCI w/2MB	160/220
ATI Mach 64 Pro Turbo VLB/PCI w/2MB/4MB VRAM	270/470

MONITORS

NANAO	
F550iw/ F550i / 340iw	$880/839/600
F560i w17"/T2.17	1165/1210
F760iw 21"/T2.20	1800/1840
NEC	
3V / 3FGE / 6FGP	459/499
XP15/XE15/XE17/XP17	629/529/955/1185
MAG	
MX15F/MX17F	420/780
DX15F/DX17F (1280x1024,0.26)	345/625
SONY	
GDM 20SE/ 17SF / 15SF	1,790/825/420
HITACHI	
CM-2095 20"	1,170
CM-2198 21"	1,835
CM-1586MV	389
ACUVUE GX20/GX21	1470/1790
VIEWSONIC	
6 E/ M -V15 G	254/380
15/15ES	399/335
17/17G/17E	810/700/675
20/21	1,380/1,599
MINI MICRO	
Interlaced (1024x768) Monitor 0.28	205
Non-interlaced Monitor 0.28	215
IMPRESSION	
GREEN 15"	310

ASA COMPUTERS, INC

National: (800) REAL-PCs (800) 732-5727
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I486SLC2-66 64K W/Math-Co
Mini-Tower Case
4 MB RAM
IDE w/2SPG
1.44 MB FDD
CON/WD 420 MB HDD
Trident 8900C/D 1 MB
14" SVGA .28 NI Monitor
ony Double Speed CD-ROM ID
SoundBlaster C Card
Speakers, Microphone
JoyStick
Educational I CD Bundle
KeyBoard, Mouse
MS DOS 6.21, WIN 3.11

$1,089

THE ROADRUNNER PCs - Value, Performance, Compatibility

System Pricing

TYPE OF SYSTEM	BUS Structure	BareBone: Motherboard Mini-Tower Case IDE w/2SPG 1.44 FDD 101 K/B Serial Mouse	Complete Systems: BareBone + 1 MB RAM SCSI 40MB HDD 14" Mono MGP Card	BareBone + 4 MB RAM IDE 170 MB 14" Mono SVGA SVGA 512K Card	BareBone + 4 MB RAM IDE 270 MB HDD 14" SVGA .39 SVGA 1MB Card	BareBone + 8 MB RAM IDE 420 MB HDD 14" SVGA .28 SVGA 1MB Card +1.2 Floppy	BareBone + 8 MB RAM IDE 540 MB HDD 14" SVGA .28 NI SVGA 1MB Card +1.2 Floppy	BareBone + 8 MB RAM IDE 730 MB HDD 15" UVGA .28 NI SVGA 1MB Card +1.2 Floppy
PentiumI* 90 w/256K	PCI, ISA	$1,020					$1,866	$1,986
PentiumO* 90 w/256	PCI, ISA	$905					$1,751	$1,872
PentiumO* 60 w/256k	PCI, ISA	$670				$1,468	$1,516	$1,637
Nx586-90 w/256K	VLB	$798				$1,575	$1,623	$1,744
486DX4-100 w/256	VLB	$422			$975	$1,198	$1,246	$1,367
A486DX2-80 w/256K	VLB	$342			$895	$1,119	$1,166	
C486DX2-66 w/256K	VLB	$315		$695	$860	$1,076	$1,124	
C486DX2-50 w/256K	VLB	$278		$658	$824	$1,040		
I486SLC2-66 w/64K	ISA,VLB	$242	$473	$626	$793			
A386DX-40 w/128K	ISA	$188	$418	$571	$725			
A386SX-40	ISA	$155	$385	$538				

PCI Systems include PCI IDE Controller and CL5434 1MB PCI Graphic Card
VLB Systems include VLB IDE Controller and Cirrus Logic 5428 1MB VLB Graphic Card
CPUs: A - AMD; C - Cyrix; I - IBM; i - Intel; Nx - NexGen
* Intel Pentium CPU based Systems

Bay Area On-Site Service Available

Business/Professional
Multi-Media System

A486DX2-80 w/256K VLB
Compact Med-Tower Case
8 MB RAM
IDE w/2SPG VLB
1.44 MB FDD
Quantum 540 MB HDD
CL5428 1 MB VLB
15" 1280 x 1024 .28 NI
Mitsumi Quad Speed CD-ROM
SoundBlaster 16 Sound Card
LabTec Speakers
KeyTronic K/B
LogiTech Mouse
MS DOS 6.21, WIN 3.11

$1,549

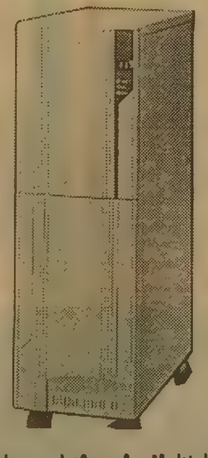
ASA... ...Proven Systems for all Applications

The THOROUGHBRED Workstations - Top-of-the-Line - Power, Functionality, Price

ARCHITECTURE	UMC(cs) - AMD	UMC(cs) - Intel	Intel(cs) - Intel	Intel(cs) - Intel	Intel(cs) - Intel	MIPS*
Motherboard	MustangO	MustangO	CapricornI	CapricornNx	CapricornI	SH-RISC
CPU	Intel 486DX2-66	AMD 486DX4-100	Intel Pentium 60 Mhz	NxGen 586 90 Mhz	Intel Pentium 90 Mhz	MIPS R4450 - 150
CPU Power Est. (Mips)	21	42	42	~60	60	75
Architecture, Cache	VLB, ISA; 256K	VLB, ISA; 256K	PCI, ISA; 256K	VLB, ISA; 256K	PCI, ISA; 256K	EISA, ISA; 512K
RAM	16MB - 64MB	16MB - 64MB	16MB - 128MB	16MB - 128MB	16MB - 128MB	16MB - 256MB
Hard Drive	540 IDE Quan MV	540 IDE Quan MV	540 IDE Quan MV	uan 730MB IDE HD	WD 1 GB IDE HDD	1.08GB 9.5ms SCSI-II
Drive Controller	WS IDE	WS IDE	PCI IDE Built-In	VLB IDE	PCI IDE Built-In	32 Bit SCSI-2 Built-in
I/O	(2) 16550 S, P	(2) 16550 S, P	(2) 16550 S, P	(2) 16550 S, P	(2) 16550 S, P	(2) 16550 S, P
Video Card	S3-805 VLB	S3-805 VLB	S3-864 PCI	S3-805 VLB	S3-864 PCI	GUI S3 1MB - 2MB
Monitor	15" .28 1280x1024NI	15" .28 1280x1024NI	15" .28 1280x1024NI	17" .26 1280x1024NI	17" .26 1280x1024NI	17" .26 1280x1024NI
Operating System	MS DOS, WIN 3.1	MS DOS, WIN 3.1	MS DOS, WIN 3.1	MS DOS, WIN 3.1	MS DOS, WIN 3.1	MS DOS, WIN 3.1
Case	SuperT w/300W PS	SuperT w/300W PS	SuperT w/300W PS	SuperT w/300W PS	SuperT w/300W PS	SuperT w/300W PS
Price	$1,704	$1,741	$2,212	$2,649	$3,023	$4,097

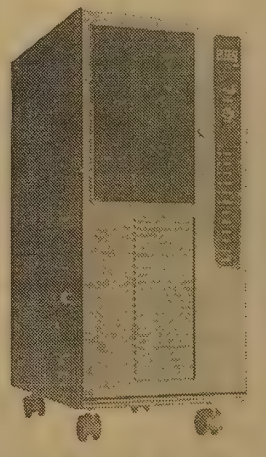
WorkStations Include: 1.2 and 1.44 MB Floppy Drives, KeyTronic KeyBoard, Logitech Serial Mouse
*Please ask for list of ported Applications

The Thoroughbred Workstations



Hardware platform for Multiple Operating Systems... and Applications demanding Workstation Power... AutoCad, P-CAD, Windows NT

The Thoroughbred Servers



Outstanding Price Performance and Functionality for Application and Networking Servers

MOTHERBOARDS & CONTROLLERS

ISA/EISA MOTHERBOARDS

286-12/20	**$20/43**
386SX-40	**$57**

THE STALLION SERIES

ISA 386DX-40 w/64,128k	**$89**
486DLC-40 w/128K	**$104**
ISA 486SX33 128K	**$164**
ISA 486DX-33 256k Intel	**$198**
ISA 486DX-40 256k Cyrix/AMD	**$176/238**
ISA 486DX-50 256K Cyrix/Intel	**$300/367**
ISA486DX2-50 256k C/AMD/Intel	**$161/244/227**
ISA 486DX2-66 w/256k AMD/Intel	**$223/273**
EISA 486DX-50 Intel/Cyrix w/256k	**$490/423**

VLB/PCI MOTHERBOARDS

486/P24T

MustangF 486SX-25 ISA/VESA	**$157**
MstngB 486DX-40 W/256K Cyrix	**$193**
MstngO 486DX-33 256k Intel	**$213**
MustangO 486DX-40 256K Cyx/AMD	**$193/255**
MustangO 486DX-50 256k Cyx/Intel	**$316/384**
MustangO 486DX2-50w/256K Cyrix/AMD/Intel	**$177/260/244**
MustangO486DX2-66 256K Cyrix/Intel	**$211/289**
MustangO 486 256k AMD DX2-80	**$244**
IBM Alaris 486SLC2-66 w/Math-Co	**$138**
IBM BlueLightng BL3-75 w/M-Co	**$NA**
MicronixJX30 486-33/50/66 Intel	**$371/540/446**
****AMI SVoyager 486-33/50/66 Intel**	**$445/615/515**
Pegasus NSuper 486-33/66 E/Vesa	**$415/520**
Micronix 486-33/50/66 Eisa/Vesa	$669/843/733
AMI Ent IV 486-33/50/66 Eisa/Vesa	$568/742/632

Intel PENTIUM and DX-4

MustangO486DX4-100 Int/AMD 256K	**$475/329**
CapricornE 256k PCI 60/66MHz	**$586/606**
CapricornE 256K PCI 90MHz	**$837**
Capricorn I 256K PCI/ISA 60w/ide-io	**$673**
Capricorn I 256k PCI/ISA 90 w/ide-io	**$956**
CapricornS 512K PCI/VLB 60/66	**$665/685**
CapricornS 512k PCI/VLB 90Mhz	**$905**
PegasusAD Dual PCI/EISA 256K 90	**$1384**
Capricorn NxNexGen 586-90 VLB w/256k	**$717**

ISA/EISA CONTROLLERS

IDE/MFM/RLL & FAST I/Os

Mustang IDE 2FD-2HD/4FD-2HD	**$14/28**
Mustang IDE w/ 2SPG	**$15**
Promise IDE Caching DC200 2FD/4HD	**$97**
FAST-PIG IDE,IO/IO w/16C550 Uarts	**$33/27**
ULTRA-IO 4S/2P 4 16C550 Bi-Dir	**$90**

SCSI

Future Domain Compatible16 bit no floppy	**$45**
Trantor SCSI Adapter T-130	**$51**
ADAP 1522 16BIT Card/Kit	**$78/137**
ADAP 1542C Card/Kit	**$201/249**
ADAP 1542C+ Kit (w/Corel SCSI)	**$317**
ADAP 1742 EISA	**$354**
ADAP 2742 EISA Fast SCSI2 C/K	**$304/354**
Bus Logic BT 742 Card	**$276**
Bus Logic BT747S Card/Kit 747S	**$291/329**
Bus Logic BT 757 Wide S card/kit	**$363**
DTC3290AS 7HD&4FD Caching	$380
AMI EISA SCSI II Caching wo/w pwrpk	$373/410
DPT Smart Cache3 EISA SCSI	$331
Mylex DCE EISA SCSI Caching Ctlr**	$228
Trantor348 Parallel Port to SCSI	$149

VLB/PCI CONTROLLERS

IDE

Mustang IDE-IO VLB Enhanced/PCI	**$19/22**
MustangP IDE w/Fast IO	**$41**
Mustang P 4030 4HD/2FD Caching	**$109**
MustangW 2008 2HD/4FD/2S/1P/2.88	**$43**
MustangW 2018 2HD/4FD /2S(16550)/1P 2.88	**$48**
DTC 2277 IDE Caching	$105

SCSI

NCR(ASUS) SCSI PCI Controller	**$79**
DTC 3270 SCSI 1	**$109**
BusLogic BT445S Fast SCSI-II c/kit	**$189/210**
BusLogic BT-910A PCI caching	**$105**
AMI SCSI II Caching w/wo pwrpk	$373/410
ADAPTEC 2842 SCSI II Kit bulk/retail	**$223/254**
BusLogic KT946S SCSI-2 PCI Kit C/K	**$247/276**
Adaptec 2940 PCI Kit bulk/Retail	**$201/291**

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ROADRUNNER SERIES

Baby Desk/Mini Tower w/PS	$41/36
Medium Tower w/PS Compact/Regular	$47/58
Full Tower(230W)/Big Tower(300W)	$66/181
Rack Mount W/PS	$331

DIAMOND SERIES (For Black add $5)

Baby Desk/Mini Tower w/PS	$63
Medium Tower Thick w/PS	$86
Full Tower w/PS	$93
File Server w/ 400W PS, 3 Fans 12 F/HDD	$359

External HDD/CD-ROM Cases

1HH w/PS 3.5"/5.25"	$57/65
1FH(2HH)/2FH(3HH)/7HH w/PS	$84/118/224
Removable IDE/SCSI Chasis & Carrier	$45/57
SCSI Cables Int/Ext	$10/11

For Un-Interruptible Power Supplies see UPS's in Networking Section

KEYBOARDS AND MICE

Regular/Spill-Resistant 101	$14/16
MaxiSwitch/KeyTronic	$23/24
Sejin/Mitsumi 101	$23/16
Small 11.5" 88 Keys/**BLACK 101**	$31
Russian/Spanish Keyboard	$17/18
Japanese Keyboard, 106 Keys	$57
Microsoft Natural	$95

Also line of European/Arabic KBs

S-Mouse/TBall	$8/20
LogiTech Ser/Bus bulk	$17/34
LogiTech Mouseman Cordless	$82
Microsoft white box S/B	$29/54
BLACK SERIAL	$14

POWER SUPPLIES

PS2 200/230/300W	$30/34/68
PS2 230/250W GREEN PC	**$44/52**
Full Tower 230/300/400W	$49/63/126
American Enhance 300w PS2/Full	$80

MASS STORAGE PRODUCTS

FIOPPY DRIVES

YE Data 1.2/1.44MB	**$41/31**
Teac 1.2/1.44MB	**$45/34**
Teac Dual Floppy 1.2 + 1.44 MB	**$88**

HARD DRIVES

2.5" NOTEBOOK DRIVES

QUN 127/call 16msec	$225/call

IDE

(Hard drive prices change often-please call!)

Dae Young 120 (30 days warranty)	**$104**
CON 170 MB 17 msec	**$129**
CON 210 14msec	**$146**
MXTR/CON 270MB 15msec	**$151**
WD 340/MXT 340MB 12/14 ms	**$179/$165**
MXTR 420 AV	**$187**
CON 420MB	**$179**
WD 425MB 13msec	**$178**
QTM 540 MV/LTS	$203/223
WD 540 12msec	**$207**
MXTR 540 8.5/12 msec	**$NA/224**
WD 730/850 12msec	**$295/330**
Quantum 730LT	**$265**
CON 850	**$325**
WD 1.0 GB	**$435**
MICROPOLIS 1/1.8GB 10ms	$489/845

SCSI - 3.5"

QTM 42MB SCSI	**$69**
CON/QTM 170MB 17msec	$189
CON 212MB 12 msec	$202
MXT 290/340MB 13 msec	$157/170
QUN 540MB MV/LTS FAST	**$215/235**
MXT 540MB /CON 540	**$228/229**
Quantum 700	**$279**
QTM 1.4 GB 10msec 5 year	**$748**
DEC 1.07GB DSP3107 9ms	$657
DEC 1.6GB DSP3160 9ms	$796
Quantum 1.08 GB	**$555**
MICROPOLIS 1/1.8GB 10ms	$589/845
HP1.2GB 10.5msec	$559
ST1.2GB ST31200N 9 msec	**$535**
Quantum 2.1 GB	$889
ST12400N ST2.1GB 9MS	**$959**
DEC 2.1GB DSP3210 9ms	$1059
******ST 3.4GB ST43400N**	**$1629**
ST 15150N 4.2GB 8msec	$2195
ST 9GB ST410800N	$3395

SCSI - 5.25"

DEC 3.0GB DSP5300	$2046
DEC 3.5GB DSP 5350	$2312
DEC 4.0GB DSP 5400	$2488

SUPER HARD DRIVES

Seagate Barracuda 3.5" HH (8 msec avg. seek, 4.17 msec lat., 7200 RPM) 1.7/2.5/4.2 GB	$call/1136/2354

FLASH CARD HARD DRIVE

ST 75A 1.8" 5.2MB IDE<1.5MS	$484
ST 710/720A 1.8" 10.4/20.9MB	$888/1177
ST 740A 1.8" 41.9MB IDE<1.5ms	$2068

EXTERNAL HRD. DRV. SUBSYSTEM

FOR EXT. HARD DRIVE........... ADD $99

TAPE DRIVES

(<500MB TAPE-BACKUPs)

Colorado 120 / 250MB	**$99/154**
Conner 250MB w/Cassette	**$144**
Conner 420 MB QIC Format	**$174**
Conner 850 MB QIC Format	**$279**
Colorado KE-10 External kit with card	**$129**
Colorado External port card	**$37**
FC-20 high perf card	**$85**
Colorado Trakker 250MB	**$294**
Archive Viper 250MB hh SCSI I/E	**$325/399**

(>500MB for PC / SERVER)

Viper 525MB hh SCSI Int/Ext 6MB/sec	$450/515
Mountain FS1200 4GB I/E	$1545/2175
Conner 4200 Int/Ext	$779/975
Conner-Python 4320 NT 2.0GB DAT 3.5"	$789
Conner-Python 4324RP 4.0GB DAT 3.5"	$846
Colorado 2.4 / 4.0 GB Qic 5.25	$859/975
HP 2GB 35470 DAT 4mm Int/Ext	$795/874
HP 4-8GB 35480 DAT 4mm Int/Ext	$895/989
HP 4-8GB DAT 1533A 4mm Int/Ext	$990/1100
WANGTEK 5100 1.0GB 4mm Int/Ext	$639/769
WANGTEK 3100/3200 2/4GB 4mm Int	$879/985
WANGTEK 3400 8-16GB 4mm Int	$1099
EXABYTE 4200/4200C 2/4GB	$779/859
EXABYTE 8205 5GB 8mm 5.25 I/E	$1245/1555
EXABYTE 8505 10GB 8mm Int/Ext	$1935/2265

(above drives require special contr & soft drivers)

TAPE BACKUP DRIVERS

Novaback for DOS//OS/2	$65
Novanet Multiuser NLM	$279
ARC Serve Single	$125
SYTOS for DOS/NOVELL, GEN	$120
Conner Backup Exec for Dos/Win v3.3	$79
Conner Backup Exec for Netware v3.1	$259

MAG/OPTICAL (Rewritable)

Ricoh 128MB 3.5" Internal	$532
HP 1.3GB 5.25" SCSI-2 EXT	$2450
MAXOPTIC 1GB Tahiti IIM 35msec	$2260

REMOVABLE DRIVES

Syquest 44MB Dr.	$249
......W/Ext Case, Cables, Cart, Cont	$379
Syquest 88/105MB Dr.	$308/389
Bernoulli 44/99 Insider	$789/840
IDE Upto 1GB removable kits	$39
SCSI: Upto 1GB Removable Kits	$138

DISKETTES & CARTRIDGES

Floppy 1.44 Bulk 20+/100+/500+	**$.49/.39/.34**
Floppy 1.2 Bulk	**$.44**
Tape DC2120 250MB..Formatted	**$16**
Tape DC 6250 5.25", 1/4" Cartridge	$25
Tape DC 6525 5.25", 1/4" Cartridge	$30
TK50 for DECs	$24
DAT 4mm 90 mtr HP/OEM	$20/14
DAT 8mm 112 mtr	$14
Syquest 44/88/105MB Cart	$62/94/85
Bernoulli 44MB/90MB 3Pk	$289/298/264
Mag-Opt 600MB/650MB 5.25" Rewrite	$86/86
Mag-Opt 1.2/1.3 GB Rewrite	$108/90
Mag-Opt 600/650MB WriteOnce	$76/76
Mag-Opt 1.2/1.3GB WriteOnce	$90/90
Mag-Opt 128/230MB 3.5"	$35/41
Mag-Opt 650/1.3GB WORM 5.25"	$144/144

VIDEO ADAPTERS & MONITORS

ISA/EISA ADAPTERS

MGP	$13
VGA 256k	$27
Trident 512K/1MB	$37/58
Tseng ET4000 1MB	$73
Mustang 1MB Window Accel	$58
ATI Ultra Grpx 1MB w/Mouse	$214
ATI Ultra 8514 1 MB VRAM(Dual mon. cap.)	**$176**
ATI Ultra Pro EISA 2MB	$294
AMI Fast View EISA VGA Graphics w/1MB	**$221**

VLB/PCI ADAPTERS

(wm = winmark ver2.5)

MustangVT Trident VLB 1/2MB	**$68/113**
MustangVC Cirrus logic VLB 5428 1/2	**$72/117**
MustangVS S3-805 VLB 1/2MB	**$68/113**
MustangET4000 VLB 1MB only	**$88**
Spider 32 1/2MB,20 WM	**$82/127**
Spider 32 Plus 1MB	**$93**
Spider 64 1/2MB VLB/PCI	**$117/160**
Spider BlackWidow+ 1/2MB PCI/VLB	**$160/221**
Spider Tarantula 2/4 MB	**$255/395**
DIAMOND Stealth 24VLB 1MB	**$132**
DIAMOND Stealth 64 1/2MB DRAM	**$119/169**
DIAMOND Stealth 64 1/2MB VRAM	**$277/440**
DIAMOND ViperSE 2MB VLB/PCI	**$255/294**
*ORCHID Celsius 1/2MB	$199/221
ORCHID Kelvin 1/2MB PCI/VLB	**$133/179**
****Hercules Dynamite Pro 2MB VLB**	**$225**
ATI Graphics Wonder 1MB DRAM PCI/VLB	$115
ATI Ultra Plus 2MB DRAM PCI/VLB	$171
ATI Graphics Exp. 2M B DRAM PCI/VLB	$210
ATI GraphicsProTurbo 2/4MB PCI/VLB	$277/484
Cirrus Logic 5434 PCI 1/2MB	**$95/145**
S3-864 PCI 1/2MB	**$95/145**
ET4000 PCI 1/2MB	**$104/154**

CAD SPECIALITY ADAPTERS

NUMBER NINE - #9GXI/GXE

L10 ISA or VLB Retail/Bulk	$249/236
L11 ISA or VLB Retail/Bulk	$359/339
L12ISA&VLBRetail/Bulk	$420/406
L14 ISA&VLB Retail/Bulk	$639/589
64 1MB/2MB....PCI or VLB	$175/249
64 PRO 2MB/4MB	$365/549

MATROX

MGA-VLB 2/Plus	$409/459
MGA-VLB 4/200	$845
MGA-IMP 3A&V	$699
MGA-PRO 4.5V/4.5+z buffer	$1095/1379
MB memory upgrade	$209
MGA-PCI 2/2Plus	$365/409
MGA-PCI 4/4-200	$616/768

METHEUS CORPORATION

Premier 928 VL2(1MB)/4(2MB)	$324/559
Premier 928 ISA 1M/2M/4M	$297/422/725
MODULE 1MB Memory	$119
1104 Plus 256 Hz, MultiDisplay	$1295

(We do not have the high end CAD adapters and monitors on display and carry only a few in stock - these are on Just-In-Time inventory basis - please place orders in advance-the prices in parenthesis are on a cash basis only)

14" MONITORS

MONO

Mono 14" amber/white	**$72**
Mono 14"/9" SVGA	**$88/120**

VGA/SVGA

SVGA 14" 1024 x 768 .39	**$190**
SVGA 14" 1024 x 768 .28 Int	**$202**
SVGA 14" 1024 x 768 .28 NI	**$217**
Black SVGA 1024 x .28 I/NI	$270/282
CTX/kanaka 14" 1024 x 768 .28 Int.	**$218**
CTX/kANAKA 14" 1024 x 768 .28 NI	**$235**

CAD MONITORS

Miscellaneous

KFC15".28 1280x1024NI wo/w Digital	**$285/350**
Mitac 15" .28 1280 LowRad,Energy*	**$305**
CTX 15"	**$315**
Orchestra Tuba 17" 1600x .26	**$585**
KFC 17" .26 1280x1024 NI w/o digital	**$629**
KFC 17" .26 1280x w/digital display	**$685**
Mitac 17" .26 1600x NI Energy*	**$689**
Viewsonic 6E 14" .28 NI Green	**$262**
Viewsonic 15E 15" 1024x .28	$365
Viewsonic 15 .28 1280x MPR2	$425
Viewsonic 17" 1600x1280 .27	**$889**
Viewsonic 20/21	**$1525/1659**
MAGNVX20CM64 20", 1280, .31.($1110)	$1150

NANAO

T560i,.26 1280NI,MPR2	($1415)$1490
T660i 20",.30 1280NI MPR2	($1999) $2110
F760iw21".31,1280NI,MPR2	($1919) $2015

NSA-Hitachi

CM 1586 15" .28 1280x	$415
NS 1764 17" 28 NI 1280x	($795)825
CM1797 17`.28.1280NI,MPRII	($975)$1099
CM2095 20" 1280 Anti Glare	($1239) $1295
CM 2198 21" .28 1280NI	($1920)$1989

Hitachi America - ACCUVUE

PS-20,.31dpi 1600x NI	($1555)$1618
PS-21, 28dpi 1600xNI	($2029)$2099
PS-21A,.28dpi 1600xNI	($2149)$2259

Sony

15SF 15" 1280x .25	$445
1730 CPD	$908
GDM17SE 17" 1600NI .25	($955)$999
GDM20SE 20"	($1865)$1939

Nokia

17" 447B Trin.25dpi, 1280x	($927)$975
21"445M.26, 1280NI	($1955)$2029
21"445X.26, 1600NI	($2566)$2615

Sampo

Sampo KDM1767 17" .28	($668)$695
Sampo 1777 17" .28 Microp	($749)$785
Sampo 2055 20" .31	($1040)$1075
Sampo KDM2077 20" NI 1280 .31	($1460)$1520

NEC

2V 14" NI .28 1024x	$349
3V/4FGE	$485/($635)$659
5FGE/FGP17".28,....($999)$1045/	($1125)$1165
6FGP21",.28,1280NI	($2005)$2095

MAG

MX15F 15"MPR II	($459)/$477
DX15F 15"	**$369**
DX 17F 17" .26 1280x	($645)/$669
MX17F,17".26,1280NI,Mic Org	($758)/$795

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Prices given in bold are usual stock items, prices not in bold are special order items and require a 20% deposit, are not returnable, and take 2-3 days lead time.

CASH COUPONS

HARD DRIVES	HARD DRIVES	HARD DRIVES	HARD DRIVES
CONNER	QUANTUM	Western Digital	SEAGATE 1.08/Quantum 2.1 GB
170/213/420IDE	540/730 MB	1GB IDE	9.5MSEC/5YEARWARNTY
$129/144/169	$204/249	$ 4 0 9	$509/869

NETWORKING

16BIT NE2000 COMP COAX/TP	$29
16 BIT NE2000COMP COMBO	$39
INTEL 10BT FLASH	$99
8 PORT TP HUB W/AUI	$144
16 PORT TP HUB W/AUI	$339

MULTIMEDIA

8BIT SOUND C/KIT	$39/59
SONY 2X INT IDE	$109
TOSHIBA 4X 3501 Int	$284
NEC 510-CDR 3X	$229
Texel/TEAC Quad CD	$309/209
Mitsumi Quad Speed IDE	$189

MULTI MEDIA

CD-ROMs

IDE TYPE CD-ROMs

SONY DOUBLE SPEED $113
Model # 55E

Panasonic 562 DblSpd.320ms, 300kb/sec.	**$125**

Super Multi-Media Complete Kit on Sale!
Mitsumi CD-ROM, 150KB/sec, 350ms
8 bit Sound Blaster Compatible Card (for Win)
Quickshot Warrior joystick
Shielded PC spealers
Deluxe model microphone
Award winning Apogee sound-supported games; all for.................$123!!!

SCSI CD-ROMs

NEC 3X 510CDR Ext 195ms,450KB/sec	**$345**
NEC 3XP Portable 250ms,450KB/sec	$460
NEC 4X Pro 16bit 180ms/600kb sec	$889

CD-ROM-#2-of-the-Month
NEC 3XI
Multispin, 195ms,450KBS....$239

TOSHIBA 3501Q Int. 120ms,600Kb/sec	**$297**
Plextor(texel) 3028/5028 240/335..I/E	**$255/339**
Plextor Quad speed bare OEM	**$322**
TEAC Quad Panasonic Interface	**$223**
Mitsumi Quad IDE Interface	**$199**
Future Domain Comp. SCSI CD-ROM Kit	$69

AUDIO CARDS & MPC KITS

Hyena Snd Bister Comp. 8bit Sound Card	**$39**
Hyena w/ Speaker, Joystck, mcrphn, game.	**$50**
Quickshot 16 w/ speakers,game,card etc	**$85**

MEDIA VISION

Pro Audio basic 16bit	$58
Pro Audio Studio 16/Power Pack	$125/59
Fusion Double CD16 Kit Int	$289
Pro 16 Multi-Media System1 SCSI /II	$649/449
Pro Movie Studio	$173

CREATIVE LABS

Sound Blaster Deluxe 8 bit	$79
Sound Blaster 16 Basic VE Retail	**$95**
SoundBlater MCD/w-asp OEM	**$79/121**
Sound Blaster SCSI/SCSI2 ASP Retail	**$139/202**
Sound Blaster 16 SCSI/ w/ASP OEM	**$113/157**
Discovery 16 kit	**$239**
Sound Blaster Voice Editor	$55
Wave/Video BlasterSE	$179/285

MISC MULTI-MEDIA PRODUCTS

Encyl 1:Encyl,Animals,World/US Atlas	**$39**
Educational 1 plus Family health	**$68**
Joystick	**$15**
Labtec 150/600 Speakers	**$16/25**
100 Watt speakers	**$48**
Video Logic Captivator Kit win3.1	$369
Midi Mate/CDPC XL	$49/1059

PLOTTERS, DIGITIZERS, SCANNERS & PRINTERS

PLOTTERS

HOUSTON INSTRUMENTS

V50 INKJET A-C,2MB BUFFER	$1298
HiPlot 7100 A-D 8 pen,LCD display	$2575
HiPlot 7200 A-E 8 pen,LCD display	$3395
DMP-162R A-E, 8 Pen, Roll Feed	$3958

DIGITIZERS

SUMMAGRAPHICS

III 12x12 w/16btn or 4bt & Pen	$312
III 12x18 w/16btn or 4bt & Pen	$539

KURTA

XLP 12x12 w/4btn & Pen	$225
XLP 12x18 w/16btn or 4btn & Pen	$429
XGT 12x12 w/4Btn	$322
XLC 36x48 w/16btn or 4btn&pen	$1520

CALCOMP

CALCOMP 12 X 12/12 x 18	$299/618
CALCOMP 18 X 24/24x36	$1275/1399

SCANNERS

LOGITECH (HAND-HELD)

SCANMAN-color Phototouch/OmniPg	$246/298
SCANMAN 256GS wo/ w OmniPage	$140/195
SCANMAN 32GS w/ OmniPage	$189
Scanman Power Page Slide	$404

MICROTEK

Scanmaker II/IIXE 1200/600dpi w/OCR	$521/899
Scanmaker IIHR 600dpi	$1055
Scanmaker IIG/IISP color cap 600dpi	$392/769

MUSTEK (Hand-held)

ScanMagic256, 400dpiw/perceive	$109
ScanMagic Color,400dpi,256 grays w/perc	$219
GrayArtist, 800dpi,256 grays w/perc	$134
Colorartist Pro,800dpi,256&colr w/per	$224

MUSTEK (Flatbed)

Paragon 600(dpi)24 bitclr,Photoshop	$542
Paragon1200(dpi)24 bitclr,Photoshop	$827
Paragon 600 Pro	$448

UMAX Technologies

UC 630 PC,1200dpi max,24bit /256gray	$675
UC840,1600dpi max,16.8 million clrs	$889
UC1260,2400dpi max,16.8 million clrs	$1185
UC1200SE,2400dpi max.,30 bitclrs	$2550

Hewlett Packard

HP IICX Color scanner	$927

Miscellaneous

Info 3gs 300dpi sheet fed	$375
Info SF-6C 600dpi sheet fed	$450
Relysis 9600 800dpi color flatbed	$2995
Tamarack 6000/8000C	$729/853

Fujitsu (Flatbed)

M3096E/G 11.7x17"400dpi 20ppm	**$4222/4894**

PRINTERS

Miscellaneous

Star Micrnix NX1001 9 Pin.120/220V	$134/144
Star Micronix 220v quantity of 100 only	$135
IGOR 132 9Pin Wide **220V** (Cyri..).in stock.......... ......with any purchase	$110

EPSON

Action 2250 9 pin,50sheet,240cps	$115
LQ 2550	$903
LQ570+ 24 pin wide, 269 cps, 11 fonts	$249
LQ 1070+ 24 pin Wide,252cps,11fts	$369
LQ 1170 24Pin ,2 resident fonts	$609
Stylus 300 Inkjet 360dpi,150cps	$221
Stylus 800 Inkjet 360dpi,150cps,100sht	$283
ActionLaser 1500 300dpi,6ppm,1mb	$655
Actionlaser 1600 600dpi/Stylus color	$947/565
DFX-5000 9pin,wide, high spd. 533cps	$1485
DFX-8000 9pin, wide high spd1066cps	$2345

CANON

BJ200e/230,360dpi,49k,7fnts,4ppm	$255/395
BJ10SX,110cps,360dpi,**Portable**	$241
BJC 600 Color,240cps,360dpi,100shtfd	$499
BJC 820 Color,240cps,4ppm,1MB	$1467

OKIDATA

OL 380/321 dotmatrix,24Pin,23K	$217/420
OL400e/410elaser 4ppm, 300dpi	$489/635
OL810, 8ppm, 300dpi	$875
OL830 Plus/850, 8ppm w/ 2MB ps	$1055/1165
OKI ML520/521 9 pin 64K	$359/475
OKI ML590/591 24 pin..auto form	$417/561

PANASONIC

KX-P2124, N-Carr, 320cps, 360dpi, 12fnts	$318
KX-P2624/2023	$381/197
KX-P1624, W-Carr, 192cps, 360dpi, 14fnts	$383
KX-P 1150/2023	$149/199
KX-P4410,5ppm,300dpi,28fnts,512k	$529
KX-P4440/4430	$999/655
KX-P3123 24pin,Nar	$265

CITIZEN

GSX 145 24Pin wide,160cps,360dpi	$349
GSX200 9pin,Narr/wide	$168/289
GSX220 24pin/CTZ projectII 3ppm	$179/279
GSX230 24 pin.8 fonts, 270cps	$221
(color option for Citizen 80 col printers	*$45)*
GSX240 24 pin 300cps, 13 fonts	$281
Notebooks CTZPN48/CTZNP-IBM	$284/326

HEWLETT PACKARD

Deskjet 540 300dpi,120cps,16k	$289
Deskjet 560C Color,3ppm,300dpi,80k	$465
Deskjet 1200C/ps Color2MB	$1357/1837
HP 4+/4P/4SI/4L/4V	$1349/922/2891/641/1995
4M+/4ML/4MV/4 SiMX	$1941/985/2785/4055

NEC

Pinwriter3300 24pin wide,360dpi,80K	$326
Pinwriter6200 24pin narrow,360dpi,80k	$399
Pinwriter9300 24pin wide.360dpi 333draft	$839
Silentwriter superscript610,6ppm,256k	$471
Silentwriter1097 600dpi,7mb	$1365

FUJITSU

10/10W Laser,10ppm,1/2mb 14/35fts	$830/942

All printers: Cash basis only and come with the Original Manufacturer's warranty. Please call for lead time. No returns on any printer purchase with this

MEMORIES, MATH-COs & CPUs

Please call for latest prices!

MEMORIES for IBMs

SIMMs

256 x 9 (3 chip)70NS	**$11.95**
1M x 9 (3 chip)-70NS BP	**$39.25**
1M x 9 (9 chip)-70NS Major brand	**$39.95**
4M x 9 (3 chip)-70NS BP	**$119**
4M x 9 (9 chip)-70NS	**$142**
4Mx8-70 maj	**$128**
1M x 9 (3 chip)-60 Major brand	$41
4M x 9 (9 chip)-60NS	$159

ESIMMs(72 Pin)

256x36-70NS	$55
512x36-70NS	$95
1x36-70NS	**$165**
2x36-70NS	**$324**
4x36-70NS	**$509**
8x36/16x36-70	**$1040/2235**
1x36-60NS	$178
2x36-60NS	$339
4x36-60NS	$545
1x32-70 NS	**$146**
2x32-70NS	**$293**
4x32-70NS	**$435**

DRAMs

1x1-70/80NS	$5.50/5.25
256x1-70/80NS	$1.75/1.60
256x4-70/60NS	$5.75/5.50

CPUs & CPU FANS

INTEL

386 DX33	$40
486 SX25/33	**$73/95**
486 DX 33	**$123**
486 DX 50 (Very hard to get)	**$295**
486 DX2 50	**$175**
486 DX2 66	**$185**
486 DX-4 100	**$455**
Pentium 60MHz	**$399**
Pentium 66MHz	**$469**
Pentium 90MHz	**$625**

AMD

386 DX 33/40	$47/48
486 DX 40	**$158**
486 DX2 50 (Hard to get)	**$168**
486 DX2 66	**$168**
486 DX2 80	**$210**
486 DX4 100	**$325**

CYRIX/TI

486 DLC 33/40	$62/68
486 DX 40	**$108**
486 DX2-50/DX50	**$99/257**
486 DX2-66	**$156**

CPU Fans

486 heat sink and fan	**$7.95**
Pentium 60,66/90	**$12/15**

LASER EXT. MEMORIES

HEWLETT-PACKARD

HP IIP, IIP+,III,IIID,IIIP	1/2/3/4MB	$75/114/155195
HP II, IID	2/4MB	$124/199
HP IIISi	1/4MB	$76/204
HP IV	4/8MB	$165/365
Deskjet 500, 500C, 550C	256K	$88

PANASONIC

KXP 4410/20/30	1/2/3/4MB	$98/148/175/215
KXP 4450 1MB		$137
KXP 4455	2MB	$164

OKIDATA

OKI 400 1	1/2MB 1	$98/ 9
OKI 800/820	2/4MB	$123/193
OKI 810	1/2MB	$111/189

MATH-COPROCESSORS

INTEL

80387 SX 16/20/25	$45/64/75
80387 DX 16/20/25/33	$35/40/45/80

Overdrives - call for latest prices

IIT

3C87SX-16/20/25	$39
3C87SX-33	$39
3C87DX-25/33/40	$39

CYRIX

83S87SX 25	$39
83S87SX 33	$39
83D87-33	$41
83D87-40	$41

Special Terms and Conditions for this Section: CPU and Memory prices change on a daily basis; please call for the latest prices. These products when bought without systems come with a minimum 15 day warranty - please inquire. We do not stock many of the above products - please call for availability.

SOFTWARES

For Networking, Communications, Tape Storage Drivers, Networking Drivers, Multi-Media and Speciality Softwares also look in the corresponding sections.

UTILITIES

Norton Utilities V 8.0	$110
Norton Anti-virus v3.0	$81
QEMM 386 V7 0	$68
AfterDark V2.0 WIN	$28
PC Tools Pro V 9.0A	$89
Disk-Doubler	$52
MickyMouse/StarTrek Screen Saver	$39

DESKTOP PUBLISHING & GRAPHICS

Corel Draw V4 0	$375
Pagemaker V5 0	$499
Harvard Graphics V3 For Windows	$267
Norton Desktop WIN V3.0	$110

DATABASES

Accesss for Windows V2	$295
DBASE IV V2.0	$540
FoxPro For Win v2.6	$93
Paradox V5.0 WIN	$322
Q & A 4.0DOS	$249
Superbase 2.0 WIN	$345
LOTUS SMARTSUITE	$448
Gupta SQL router/SQL server	$174

ACCOUNTING/BUSINESS

CA-Accpac BPI Integrated	$148
CA-Acc. Simply Accounting DOS	$79
DAC Easy Accounting/Payroll 4.3	$94
Works for WIN 2.0	$129
MS Project 3.0 for WIN	$425
MS Office 4.2 (Word,Excel,Pwrpoint,Mail)	$475
MS Office Pro v4 3	$595
MS Office 4.2 OEM standard	$285
MS Office Pro v4.3 OEM package	$349

SPREADSHEETS

LOTUS WORK V3.0	$99
MS Excel V5.0	$299
MS Works for WIN	$123
Quattro Pro V 5.0 WIN/DOS	$54

WORD PROCESSING AND GRAPHICS

AMI Pro 3.1	$240
Professional Write V 2.2	$159
MS Word 6.0 for DOS/WIN	$305/299
Word Perfect 6.0 for DOS/WIN	$319
WordStar 7.0	$264

COMMUNICATIONS

Procomm Plus 2.01/WIN	$70 /97
WinFax Pro V 3.0 for WIN	$99
Norton PC Anywhere 4.5 Host/Rem	$65/86
CrossTalk for WIN	$129

PROGRAMMING LANGUAGES & OPERATING SYSTEMS

M.S. DOS OEM 6.22	**$45**
M.S. OEM Windows 3.1 for PC system	**$49**
M.S OEM WIN FOR WORKGROUPS 3.11	**$56**
M.S. Windows V 3.11 Original	**$92**
Windows NT 3.1 /UPGRADE	$314/278
Novell DOS 7	$59

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CASH COUPONS

MONITORS
K F C 1 5 "
.28 1280 NI
$284

MONITORS
Orchestra Tuba
17" .26 1600
$579

COMMUNICATIONS
US ROBOTICS
14.4 F/M Int/Ext
5 YEAR/16550 UART
$89/109
(limited time, one per customer)

MOTHERBOARDS
MUSTANG O
C486DX2-66
VLB 256K CACHE
4MB RAM installed
$349

MOTHERBOARDS
CapricornNX
586-90 Mhz VLB
$689

MOTHERBOARDS
PENTIUM
CapricornSS series

60 Mhz PCI	$559
90 Mhz PCI	$799

ADAPTERS
CONTROLLERS

2SPG W/16550	$24
SCSI w/DRIVERS	$44
ADAPTEC VLB SCSI	$199
ADAPTEC PCI SCSI	$189

ADAPTERS
VLB / PCI

CL 5428 1MB	$69
HERCULES DYNA 1MB	$165
DIAMOND ST64 2MB	$159
S3 VLB/PCI 1MB	$69/89
ATI Mach 32/64 2MB	$229

COMMUNICATIONS

FAX-MODEMs

PONY 902Z 96/24 Fax (Send)/Mod Int	**$27**
PONY 992Z 96/24 Fax/Modem	**$39**
PONY 992NZ 96/24 F/M, v.42 bis Enh	**$55**
PONY 1414IZ 14.4 F/M,.32/.42 w/Bitfax Int.	**$50**
PONY 14.4 F/M .32/.42 Int w/Voice prm	$100
PONY 28.8 F/M Int(14.4/28.8)	**$93**
PONY 992PZ Pocket 96/24 F/M,.32/.42	$63
PONY 1414PZ Pocket 144 F/M, v.32, v.42	$176
PONY 992MG PCMCIA 96/24 F/M v. 42	$132
PONY 1414MG PCMCIA144/144 F/M v.42	$244

AT&T Paradyne

DataPort 14.4 Fax V.32bis Int/Ext	$125/145
Keep in Touch PCMCIA 14.4 S/R Internal	$259

US ROBOTICS

14,4 Sport Mod/Fax V.32b V.42b I/E	**$97/111**
28 8 Sport M/F v.34 Int/Ext	$218/230
14,4 Mac&FAX Ext. Mod/fax	$120
19 2 HST Courier Ext modem	$389
Modem Sharing Single/Dual Kit	$548/964
World Port Pocket 14.4 Mod/fax Int	$255

ZUPRA

14.4 Budget Int/Ext. F/M	$85/119
14.4 Class I Int/Ext F/M	$113/139
14.4 Class II Int/Ext F/M	$154/183
28.8 Int/Ext F/M	$219/249

HAYES

Accura 14.4 F/M .32/ 42 Int/Ext	$149/159
Optima 14.4 F/M .42 Int/Ext	$359/372
Optima F/M PCMCIA	$285
Optima 14.4 F/M Pocket	$335
Optima 28.8P F/M	$449

ZYXEL

U-1496B 16.8/14,4 VoiceFax SW,S/R Int	$318
U-1496B+19.2/14,4 Voice Fax SW,S/R Int	$429
U-1496E 16.8/14.4 VFax SW,S/R LED Ext	$298
U-1496E+ 19.2/14.4VFaxSW,S/R LED Ext	$419
U-1496+ 19.2/14.4VFaxSW,S/R LCD Ext	$625
U-1496+19 2/14.4 S/R LCD MAC Ext	$639
U-1496E+ 19.2/14.4 S/R LED MAC Ext	$429

PRACTICAL PERIPHERALS

14.4 Fax/Modem S/R Internal	$143
14.4 Fax/Modem S/R External	$154

Miscellaneous

XIROM 14.4 PCMCIA	$
Megahertz 14.4 PCMCIA Type3	$298
Motorola 14.4 Int/Ext	$call

NETWORKING PRODUCTS & SERVICES

ETHERNET Adapters

NE 2000 Plus Comp 16bit Coax/10BT	**$29/29**
NE2000 Plus Comp Combo soft&hard config	**$36**
NE 2000 COMP COMBO AUI+BNC+RJ45	**$51**
D-Link 16 Bit,SoftConfig. 10BT 1/6 Pack	$70/377
Intel EtherExpress 16/5pk/20pk	$106/480/1752
Intel EtherExpr 16 MCA C/16 MCA TP	$177/177
Intel EtherExpress 32 EISA/Flash 32C	$427/232
Intel EtherExpFlas TP/C 5/20pk	$141/632/2368
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SMCEthcardEliteUltraCOBO 1/6	$125/625
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3 Com 503 Etherlink II 16 Bit Coax/TP	$164/173
3 Com 507 Ethlink II 16 Bit Coax/TP	**$279/316**
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Microdyne NE2000 Plus	$89/81
HP Ethertwist PCLink/6pk	$159/759

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4Port Passive Hub	$19
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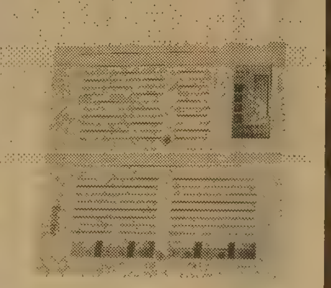

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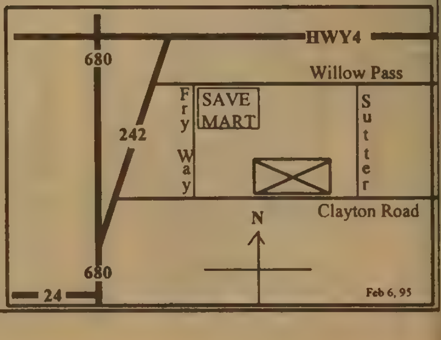

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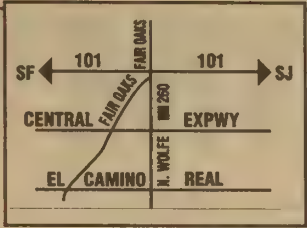

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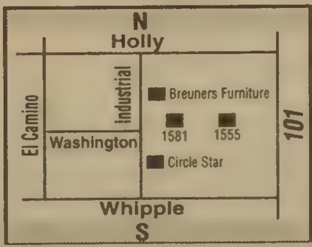

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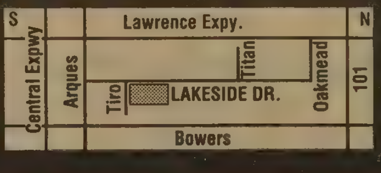

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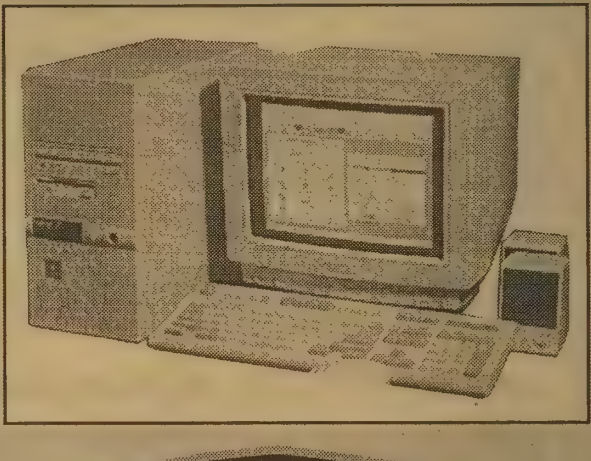

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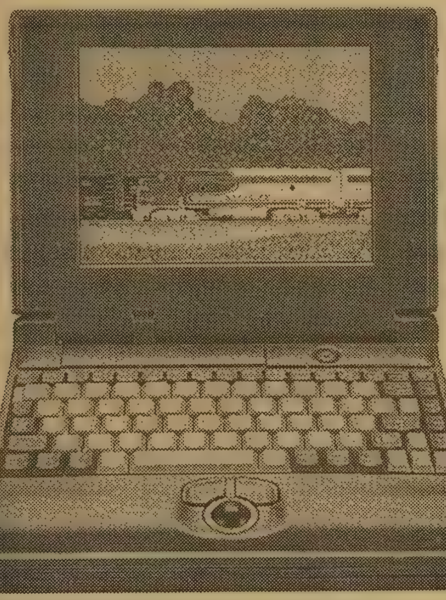

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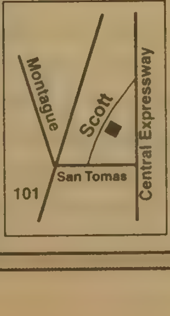

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Internet

How To Register Domain Names

BY JOHN S. QUARTERMAN AND SMOOT CARL-MITCHELL

We've received such a large volume of responses from our domain name article several months ago, we decided to explain in more detail how to register a domain name.

First of all a few caveats about domain names.

The ISP Option

While you do not have to have a host on the Internet to have a registered domain, at least two machines on the Internet must act as servers for your domain.

You cannot just get a domain name without also having at least two servers on the Internet. You do not have to have your own server; you can have another organization act as a server for your domain name. Usually, when you get connected, your Internet Service Provider (ISP) will both register a domain for you and also provide two servers for your domain. Not all ISPs provide this service, so check around for one that does before connecting.

For example, here at Zilker Internet Park we will register a domain name for our users, if they want one. We currently do this as a no-cost service for our users. We do require at least a login account for this service. Other ISPs provide similar services. Some charge a fee to cover their cost of registration. Be aware that these fees are usually quite low (almost always under $100).

Do not be fooled by a service provider that charges more, or an organization that claims it must charge a fee for registering a domain name. If they are covering their own costs, that's fine. But if they charge you more than $100, start to ask questions, or find a reputable ISP that will register your domain name for a reasonable fee.

You can also register your own domain and set up your own server without going through an ISP. You still need to get someone else to run a second domain server for you.

If you ran both of your domain servers, both would be inaccessible when your link to the Internet was down, thus defeating the purpose of having two servers. Mail being sent to your domain would in that case be returned to sender, labelled host unknown. If the second server is elsewhere, it is likely to be up even when the one you're running is down. That way, mail for your domain will simply be queued at the sending host until your Internet link comes back up, or until a timeout period of several days expires.

To find an organization that will run a secondary nameserver for your domain, ask around at local computer clubs, or on the Net. Many ISPs will run secondaries for organizations that are not otherwise their customers. Zilker will do it, for example.

Do-It-Yourself

Here is how to register your own domain, and some of the pitfalls in this process.

If you want to run your own server, you must have an already registered IP network number for the network that contains your domain server. Today you usually obtain this from an ISP; in the past you could get an IP network number without going to a specific ISP. Due to reorganization of the IP routing infrastructure, you now must obtain an IP network number (usually a Class C address) from your ISP.

WHILE IT IS COMMON FOR AN ORGANIZATION TO HAVE ONE DOMAIN NAME AND ONE IP NETWORK NUMBER, THERE IS NO REQUIREMENT THAT IT BE THAT WAY.

You can have more than one IP network within your organization, and still have only one registered domain. Lots of people have the impression that there is one IP network number per domain and one domain per IP network. That's just not so. Domains are labels for organizations, much like company and department names. IP network numbers are addresses for networks, much like street addresses and street numbers. You can have several streets on your company or university campus, but you normally have only one company or university name. Similarly, you can have several networks inside your organization, but you still normally have only one domain name for your organization.

There are also cases where a domain may span several networks, but let's not get into that. The main point is that while it is common for an organization to have one domain name and one IP network number, there is no requirement that it be that way. Some people even get the idea that domains have numbers. They don't. Networks have numbers. Domains are names.

Another source of confusion is between hosts and domains. A host is a computer, that is, a physical piece of hardware. A domain is a label; a name. A domain may apply to a specific host, but not all domains do. For example, *latimes.com* labels an organization, the Los Angeles Times. There happens to be a specific host responding at that domain, but there doesn't have to be. For example, *buffalo.edu* labels the University of Buffalo, and there's no specific host associated with it. In addition, *news.latimes.com* presumably refers to the news department, and once again there happens to be a host associated with it, but there wouldn't have to be. At some point you reach leaf nodes on the domain tree, such as perhaps

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reporterx.news.latimes.com, and those leaf nodes are normally associated with specific hosts. So some domains label hosts, but others label companies, departments, workgroups, or other organizational entities, with or without an associated specific host.

Next you can get the domain registration form from the Internet NIC. You can get this form online via FTP from the InterNIC registration server. The WWW URL for the registration form is *ftp://rs.internic.net/templates/domain-template.txt*.
You can also reach the registration service via phone or by mail at:

Network Solutions
InterNIC Registration Services
505 Huntmar Park Drive
Herndon, VA 22070
voice (703)742-4777
fax (703)742-4811

Fill the form out and return it to the registration service. The preferred method for returning the form is via electronic mail to *hostmaster@internic.net*.

The form is, for the most part, self-explanatory. Within several weeks the domain will be registered, or you will receive a notice that the domain name is already taken. Note that you must pick a domain name under one of the top-level domains. The most common choice is com which is for commercial companies. So, for example, we picked the name tic under the com domain.

If you are in Europe, check with *hostmaster@ripe.net*, or look on *ns.ripe.net* with FTP to get current European registration forms.

At the present time, you must pick a name directly under one of the top-level domains. You cannot pick a name like *on.the.info-highway.com* . You can pick the name *info-highway.com* and then create the domain name *on.the.info-highway* yourself. Once you have your domain registered, you can create any sub-domains that you want.

Staking Out Turf

Can you reserve domain names for future Internet access? If you can find an ISP that will serve your domain, there is nothing that prevents you from reserving domain names for future use. That is, you can simply have the domain present on the Net, but without it serving any function. Right now, there is no requirement that your domain name be served immediately. The form does ask when the domain will be operational. This is so the InterNIC can place the domain in the root tables of the DNS system. They will not do this until your servers are up and running.

Of course, you can also register a domain for use through the UUCP network, or through some other network. A domain doesn't have to be used on the Internet. Setting up a domain for use with UUCP is a longer story than we want to go into here, however.

That is essentially the procedure for registering a domain name. You can do it yourself, if you want to, but going through an ISP is often easier and the time saved by going through an ISP is often worth the usually nominal cost.■

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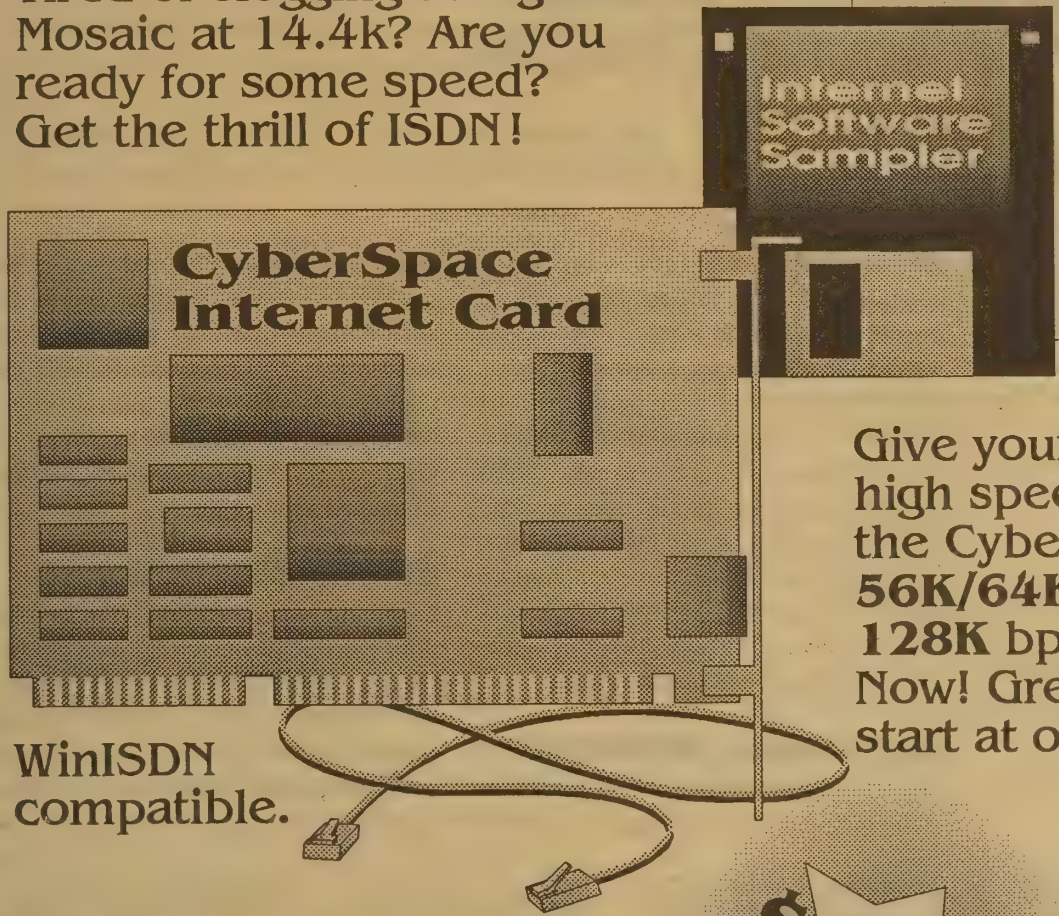
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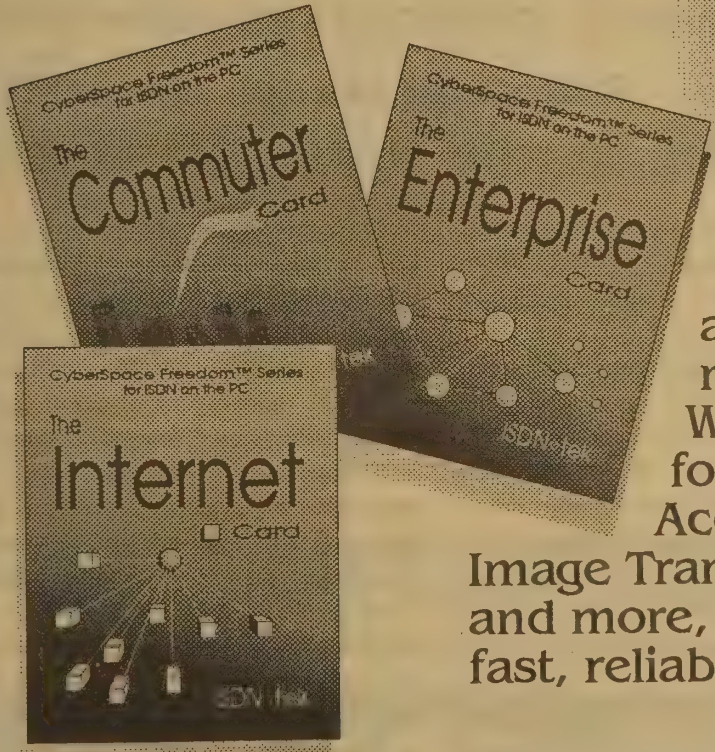
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Online Services

Life In The Online Fishbowl: CompuServe, Unisys, And .GIF

BY KATHLEEN CREIGHTON

Unlike most businesses, which are able to keep their bad publicity under wraps, at least for a while, online services operate in a fishbowl of customers with access to each other. The nature of life online is that online service customers not only spread the word about the service right there under the service's nose, but also migrate to other online venues, including Usenet and local BBSes, to make sure bad news travels fast.

From a business standpoint, this fact of life online has an interesting effect. The most responsive, straightforward, and honest businesses are able to maintain the respect and patronage of their customers, even in the worst of times. Secrecy or manipulation of the facts is always a recipe for public relations disaster.

> In the online fishbowl, the most responsive, straightforward and honest businesses are able to maintain the respect and patronage of their customers, even in the worst of times.

CompuServe was recently faced with this when word got out to the online populace that the graphic image file format (.GIF) that CompuServe (CIS) has promoted over the years was now going to be "subject to royalty."

A Short History Of .GIF

Before I continue with the saga of the ".GIF royalty" story, let me digress to explain what .GIF files are and why this has gotten so much attention.

CompuServe promoted .GIF by making it the standard graphics file format on CIS. Because of the volume of CIS .GIF files, this encouraged others who were storing graphics and offering them for download to stay with that format, and it ultimately became the de facto graphics file format for upload/download graphics. This means that if you created a .PCX graphics file with PC Paintbrush software and wanted to share it online, you'd first want to convert the file to .GIF format because people didn't necessarily have software to read .PCX files, but everyone had .GIF viewing software.

.GIF file creation uses a technique called "LZW" (stands for the authors' initials) to create a smaller file from the large, original graphic. This is important, because a smaller file will take up less storage space, and file uploading/downloading will be cheaper on any online service which charges access time (or by toll call). Unisys holds the patent on the compression algorithm, or file compression method, for .GIF.

Unisys and CompuServe reached an agreement regarding payment of royalties for .GIF software, but somehow this agreement was only recently made public.

And The Rumor Mill Goes Wild...

When this information got out, it quite literally happened that CompuServe executives were notified by someone online that CIS had to get someone "out front" immediately to explain the situation. [See cover story for more.]

Fur flew; the executives and public relations department at CompuServe broadcast an explanation online, and not just on CompuServe itself. By doing this, CompuServe at least had a fighting chance of heading off rumors and bad online publicity. By the next day, people who had been watching this story unfold had a better grasp of what the "royalty" discussion really meant.

But that was just the first part of the problem. The big commercial online services, with their monolithic, faceless corporate owners (CompuServe is owned by H&R Block), are more often than not the objects of disdain.

A story like ".GIF is subject to royalty" has the potential of living on for years. Anyone who doubts this might want to start a topic somewhere about "Prodigy can read its users' hard drives" and see what happens. That story has been circulating since 1988. In a way, the .GIF story might even be worse, because .GIF file collectors (and there are tens of thousands of them) border on an almost fanatical obsession with having more.

Questions And Answers

In the interest of heading off misinformation, Tim Oren agreed to answer questions that occasional .GIF file users might have.

Did CIS know that there would be a patent conflict when it started promoting .GIF as the standard graphics file format? Or is this an attempt by CIS to get rich off the royalty fees?

The developers of .GIF did not know the LZW technique was patented. It was found in a literature search of open sources, and though a patent was in the process of being obtained when the original publication was made, there was no disclosure of this. The developers used what they believed to be a public domain technique.

How come Unisys can go back to past years and now claim royalties? Don't they have to protect their patent by defending it all along?

A patent is good for seventeen years from the date of issue. A patent doesn't require the same kind of defense a trademark requires (that is, constant supervision of who's using it). Claiming past royalties is their right.

I have many .GIF files. What does this mean to me? Can I still upload/download them to CIS/BBSes and other systems?

Yes. This whole affair has no effect on end-users of .GIF. You can have as many .GIFs and .GIF tools as you want. This is a problem for the developers of graphics

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I call a BBS that has thousands of .GIF files. What does this mean to the BBS operator? Will s/he no longer be able to offer these files?

Again, simply having files is not a problem, nor is making them available for others. If your BBS operator has provided a special software program that decompresses .GIF, or has a .GIF encoder built into the BBS server, there might be a problem for him or her, but not for the end-user.

If the BBS does use LZW in .GIF in either of these ways, then the operator might need a license from Unisys if it's a homebrew; otherwise the responsibility is on the provider of the BBS software and/or server technology.

What about BBSes that are primarily .GIF collections and charge money for subscriptions? Does this mean that they're out of business?

Same answer as above. If the service includes providing or operating .GIF encoders/decoders, then the BBS or its technology vendor may need to seek a license. If the users and server just store and fetch .GIFs, there should be no problem.

I scanned in some files and made .GIF images out of them. I'd like to make those files available on Usenet. Can I? Under what circumstances?

Yes, you may. Usenet just carries bulk transmissions. Transmitting a .GIF is not a problem, because the binary is a product of operating the LZW "invention"—it does not embody the invention, which is the test for patent infringement.

I am designing my own World Wide Web home page and I have a .GIF image I'd like to use in it. What does this mean to me?

Same as above. A Web page is simply a repository of data. Web browser vendors may have to seek a license from Unisys, but the end-user of either client or server is fine.

I paid a Web page designer quite a lot of money to design a home page for my business, and it does include some .GIF images. Do I have to have the page redesigned? What exactly do I have to do?

Nothing... .GIFs are not contraband, or taxable.

If CompuServe and the World Wide Web and graphics communities work together to alter .GIF to avoid the Unisys LZW patent, then you may end up wanting to convert your .GIFs sometime in the future, if we can add some useful features during that change (such as 24-bit support, for instance). But you can take your time and see what happens. You certainly don't need to pay your designer again.

What if I'm still confused over whether I need an LZW license or have some liability risk?

Talk to your company's corporate counsel or consult a qualified intellectual property attorney. CompuServe may not be making any money off this, but the lawyers will...■

Late-Breaking GIF News

Over the past two weeks, there has been considerable discussion related to the .GIF graphics format specification, PC WORLD NOVEMBER 1993

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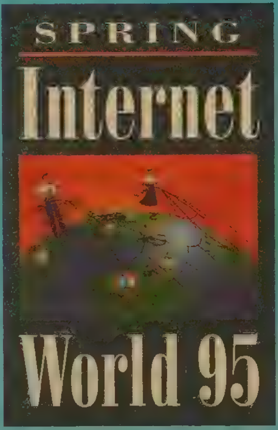

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resulting from the fact that the .GIF specification designed by CompuServe contained proprietary LZW compression technology. However, CompuServe remains committed to the continued free interchange of online graphics. For this reason, we will be offering our resources to develop a follow-on specification to .GIF that will offer significant enhancements and be free and open.

CompuServe is announcing that we will coordinate the development of .GIF24, a successor to .GIF capable of 24-bit lossless compression. CompuServe is committed to keeping .GIF24 as an open specification, available without cost. This effort will also avoid a proliferation of standards. The new specification will be developed in cooperation with the graphics community and will include a review of relevant technology and intellectual property issues.

In keeping with these goals, we are soliciting input from key GIF users such as: commercial graphics vendors, the CompuServe GO GRAPHICS Forum community, Internet communities including the World Wide Web, and bulletin board developers and users. As the first step in this process, we have been interacting privately with many people who have offered constructive input on .GIF via CompuServe and the Internet.

As the next step, we have established an email address for public input regarding GIF24. Suggestions can go to: .GIF24@csi.compuserve.com *when sending from the Internet, or* CSI:GIF24 *when sending from CompuServe. We invite suggestions of design goals for .GIF24 as well as technologies to be considered for use in the new specification. In addition, we solicit nominations of community representatives who will be invited to participate in developing .GIF24 as an open standard.*

CompuServe wishes to acknowledge the contributions of the online community to the ongoing .GIF discussion, and we look forward to further input. Based on the response to this announcement, we will shortly provide a synopsis of initial design goals for .GIF24, an initial list of nominees to participate in the development, and further details on the development process.

Thank you for your time and input.

Sincerely,
Tim Oren
CompuServe vice president,
Future Technology

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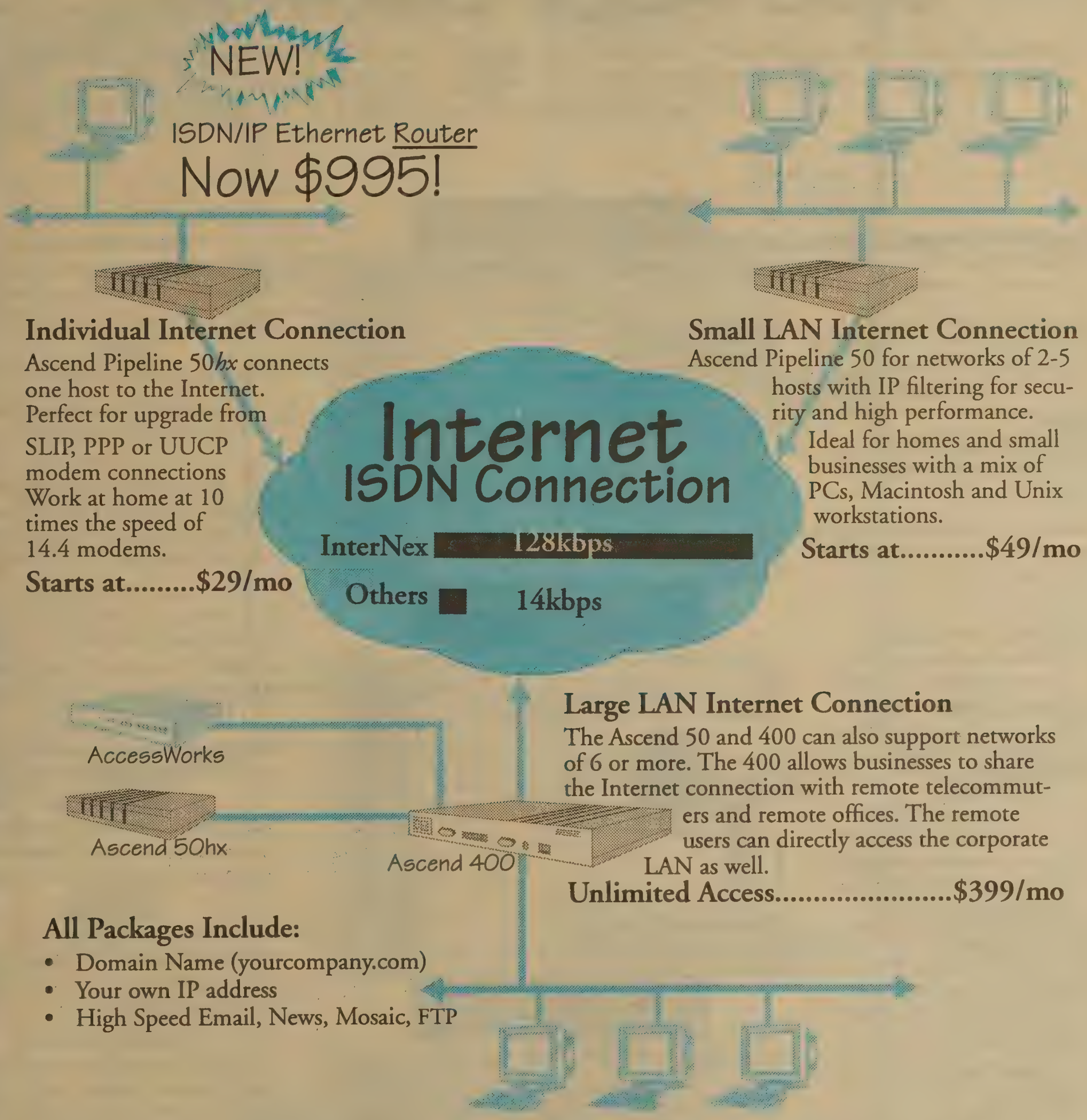

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Web Page Listings

Looking for beaches to Netsurf? Announcing MicroTimes' new listing of World Wide Web pages. Herewith is an assortment of cool, interesting, and informative Web sites to tickle your fancy and stimulate your mind.

BEST INTERNET COMMUNICATIONS, INC
http://www.best.com Internet service provider information. [Exp. #138.]

BOB BICKFORD'S HOME PAGE
http://www.well.com/Community/rab/index.html The still-evolving home page of Bob Bickford, Professional Wild-Eyed Visionary. [Exp. #138.]

THE CALIFORNIA LIBERTARIAN PARTY
http://www.lp.org/lp/ca/lpc.html [Exp. #138.]

COOLWARE'S PLACE ON THE INTERNET
http://none.coolware.com/ Coolware hosts *Good Medicine* Magazine and the electronic Job Guide. [Exp. #138.]

THE ELECTRONIC GOURMET GUIDE
http://www.deltanet.com/2way/egg The eGG is the Internet's first full-color food magazine featuring interviews, articles, recipes, columns, news, and links. [Exp. #138.]

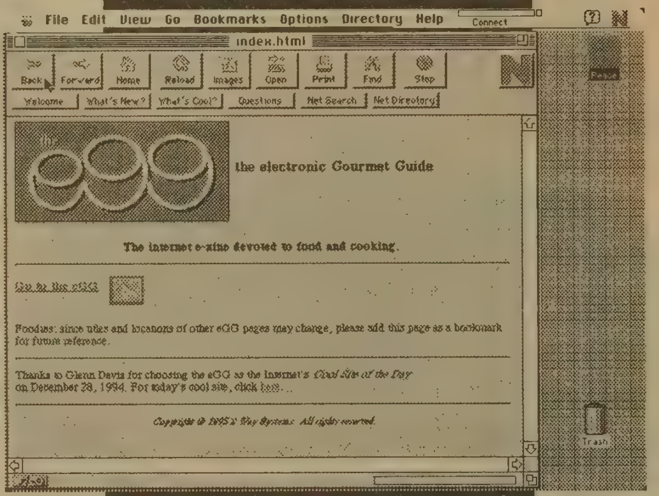
FIRST VIRTUAL
http://www.fv.com/access/by-seller/Internet_Info "New on the Net" report: includes all noteworthy registrations of commercial domains registered with InterNIC. [Exp. #138.]

FOCUS ON AFRICA
http://login.eunet.no/~presno/sample4.html Connectivity issues, sources of information about Africa for various application (news, Web, and gopher servers). [Exp. #138.]

FUTURE NEW$
http://futurenews.com/wall-street Newsstand focused exclusively on forecasting Wall Street and global financial markets. [Exp. #138.]

THE HONG KONG BUSINESS DIRECTORY
http://FarEast.Com/HongKong/directory.html Source products, find manufacturers, locate importers and exporters, find hotels, services, suppliers, buyers, even individuals in Hong Kong. [Exp. #138.]

THE INSTITUTE FOR GLOBAL COMMUNICATIONS PROGRESSIVE DIRECTORY
http://www.igc.apc.org [Exp. #138.]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Options
Directory
Help
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index.html
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Forward
Home
Reload
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Print
Find
Stop
Welcome
What's New?
What's Cool?
Questions
Net Search
Net Directory
Trash

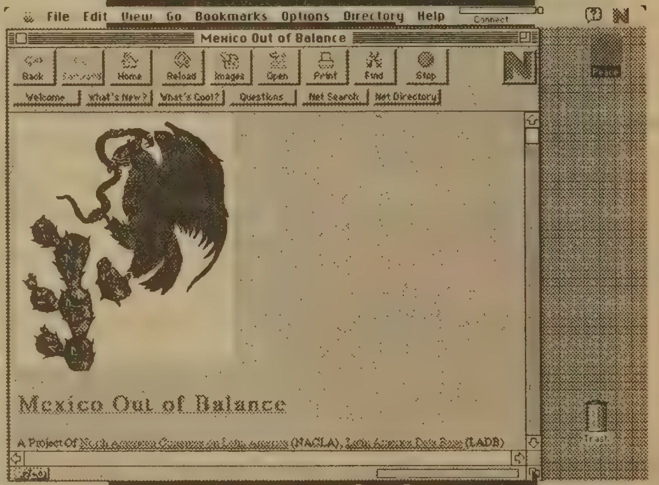
the electronic Gourmet Guide

The internet e-zine devoted to food and cooking.

Foodies: since titles and locations of other eGG pages may change, please add this page as a bookmark for future reference.

Thanks to Glenn Davis for choosing the eGG as the Internet's *Cool Site of the Day* on December 28, 1994. For today's cool site, click here...

The electronic Gourmet Guide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What's Cool?
Questions
Net Search
Net Directory
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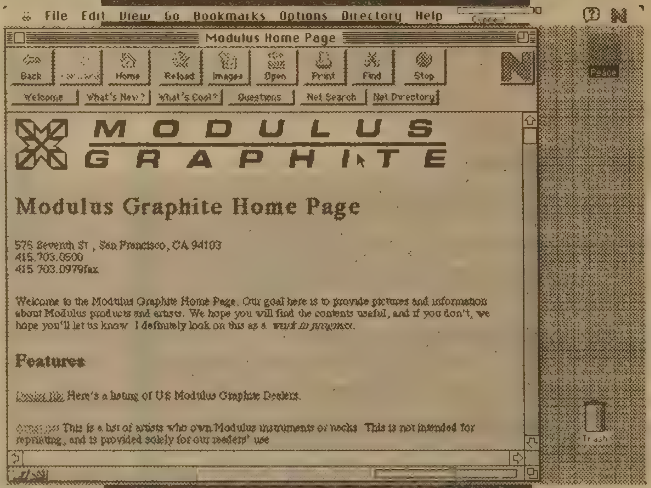
Mexico Out of Balance

A Project Of North American Congress on Latin America (NACLA), Latin America Data Base (LADB)

Mexico Out of Balance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Modulus Graphite Home Page

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Welcome to the Modulus Graphite Home Page. Our goal here is to provide pictures and information about Modulus products and artists. We hope you will find the contents useful, and if you don't, we hope you'll let us know. I definitely look on this as a *work in progress*.

Features

Dealer list: Here's a listing of US Modulus Graphite Dealers.

Artist list: This is a list of artists who own Modulus instruments or necks. This is not intended for reprinting, and is provided solely for our readers' use

Modulus Graphite

INTERNAL REVENUE SERVICE
http://www.ustreas.gov/treasury/bureaus/irs/irs.html Includes some tax forms, FAQ, where to file, where to get help. [Exp. #138.]

INTERNOTES
http://www.tbo.com/notes.html [Exp. #138.]

THE LIBERTARIAN PARTY, AMERICA'S THIRD PARTY
http://www.lp.org/lp/ [Exp. #138.]

MAKIN' WAVES STUDIO
http://cyberzine.org/html/Waves/wavepage.html Aussie-style humor abounds, complete with free .wav sound files for download. Commercial enquiries welcome. [Exp. #138.]

MEXICO OUT OF BALANCE
http://www.igc.apc.org/nacla/mexico.html Hard-to-find, in-depth information and analysis concerning political, economic, labor, and trade issues in Mexico. [Exp. #138.]

MODULUS GRAPHITE
http://www.dnai.com/~modulus Catalog of high-end basses and guitars. [Exp. #138.]

THE NORTH POLE
http://northpole.net Browse the North Pole; read messages from Santa, his elves, the reindeer; North Pole weather reports. [Exp. #138.]

OPENMARKET
http://directory.net/netinfo "New on the Net" report: includes all noteworthy registrations of commercial domains registered with InterNIC. [Exp. #138.]

RANDY KSAR'S HOME PAGE
http://www.mvhs.edu/~rksar Gives links and documents to those in need of a quick overview of the Web. Also offers Web services. [Exp. #138.]

THE SAN FRANCISCO NETWORK
http://www.SF.net Growing collection of Bay Area databases and newsletters including restaurants, wineries, entertainment, and commercial locations. [Exp. #138.]

THE SHAW FESTIVAL
http://www.cyberplex.com/CyberPlex/Arts/Shaw/Shaw.html Information about shows currently being performed by the only company that specializes in plays written during G.B. Shaw's lifetime. [Exp. #138.]

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PCS

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IBM

486SLC/64K Cache	135
486SLC 50MHz 64K Cache	115
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Blue Lightning 75MHz	220

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Mini EISA 256K	200
Super EISA 256K	260
Super EISA 512K	324

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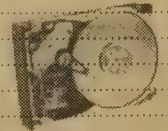

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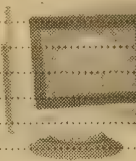

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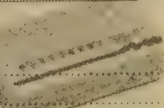

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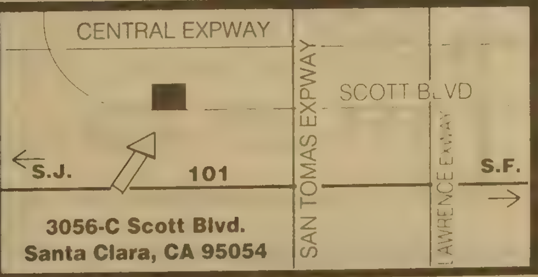

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Star Trek: Voyager

http://voyager.paramount.com Latest Web site by Paramount promotes new Star Trek show and connects studio with the fans. [Exp. #138.]

TV Net

http://tvnet.com/TVnet.html TV Net provides information on broadcast/cable TV stations throughout the US and the world. [Exp. #138.]

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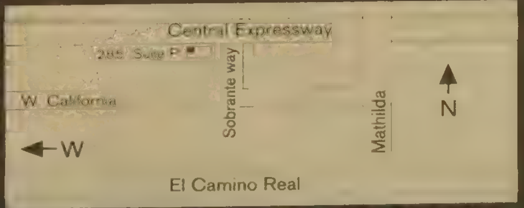

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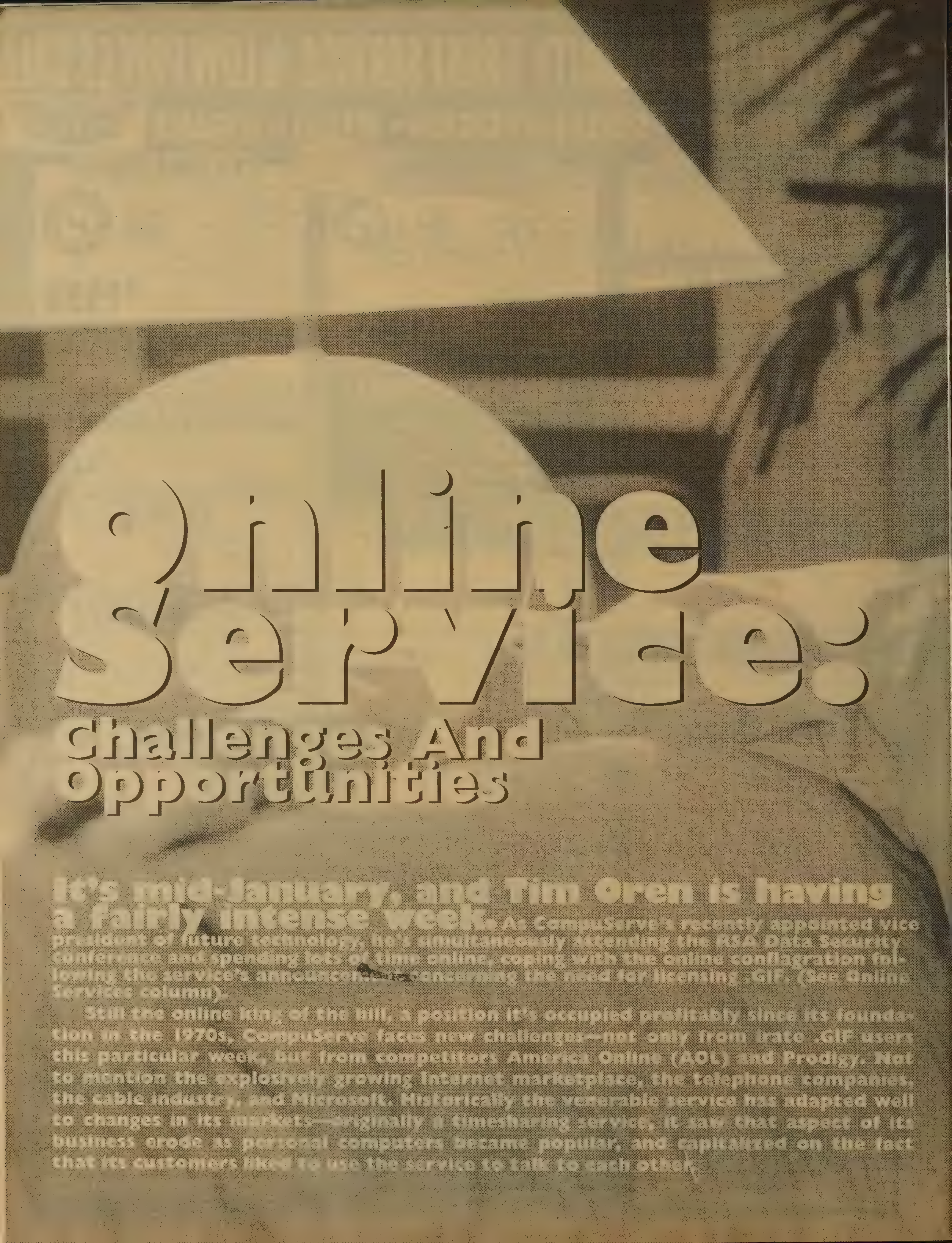

Online Service:

Challenges And Opportunities

It's mid-January, and Tim Oren is having a fairly intense week. As CompuServe's recently appointed vice president of future technology, he's simultaneously attending the RSA Data Security conference and spending lots of time online, coping with the online conflagration following the service's announcement concerning the need for licensing .GIF. (See Online Services column).

Still the online king of the hill, a position it's occupied profitably since its foundation in the 1970s, CompuServe faces new challenges—not only from irate .GIF users this particular week, but from competitors America Online (AOL) and Prodigy. Not to mention the explosively growing Internet marketplace, the telephone companies, the cable industry, and Microsoft. Historically the venerable service has adapted well to changes in its markets—originally a timesharing service, it saw that aspect of its business erode as personal computers became popular, and capitalized on the fact that its customers liked to use the service to talk to each other.

Oren comes to CompuServe, where he once served as co-sysop of the Atari forum, from Apple and Kaleida. He's charged with implementing some of the advanced technology he's been working on into the service's ever-evolving business. (CompuServe, 1-800-554-4079)

What were you doing at Apple, what were you doing at Kaleida, and how does that lead to CompuServe? Seems like a bit of a stretch.

Actually, from my point of view it was extremely logical. The last position I held at Apple was managing research in Advanced Technology. We were looking at things like hypertext and text databases, agent technologies—one of the last projects I worked on was something called Telecommunity. We were also looking at collaborative multimedia and so on.

At the time that Kaleida became available as an option, it was because they'd decided to take on doing a networked version of ScriptX. ScriptX is the product of Kaleida Labs that is an attempt to be a cross-platform authoring and delivery language for multimedia. I came in there to build a team that would create a networked version, that would allow one to specify interactive multimedia in a networked situation instead of just off a CD-ROM.

Given what I'd been doing in terms of back-end database architectures, multimedia for groups, and the interest I had in telecommunity stuff, for which I'd put in some long discussions with [*Virtual Community* author] Howard Rheingold, for instance, it seemed like a natural, to want to build that platform.

So I jumped over to there. My interest was building a platform I'd want to use to support some of the concepts we'd been working on.

Well, as you know, there were some cutbacks there, and the stuff that was cut back was the further-out stuff.

I.e., what you were interested in.

I.e., what I was interested in. And I saw it coming far enough out to put out a few feelers. A recruiter who will go nameless but who must have psychic powers called me up at about the same time and said, "How'd you like to move to Columbus, Ohio?" [*laughs*]

It didn't seem like the obvious move until they explained what was going on, that they were looking for someone to help bring advanced technology into CompuServe more quickly.

The service is essentially still text-based?

No, it's been graphics-based for some time. There are some portions of it that still are ASCII menus, particularly some of the older parts of the service, or the things that are more for sophisticated users, like financial databases and so on. But good chunks of the service, like *US News* as an example, are graphic at this point.

That's good, that's what you've got to do these days, but it's not actually out ahead. Part of what they wanted was somebody who had some experience in transferring advanced technology out of research and into products and services. I had that experience, and they were in the online business, which by the rationale I've just told you, I was more or less headed toward.

Upon due reflection it seemed like a good fit, and a chance to make a difference in a company that did need to move forward. And they offered me some pretty good terms, I have to confess, so—sold!

How would you compare the two company cultures? CompuServe is after all owned by H&R Block.

It is owned by H&R Block, but I would have to say that the company cultures between Block and CompuServe are quite different. We operate in a way that's connected up basically at the executive level.

So I assume you're talking about the contrast between CompuServe and Apple. I'd say the thing in common is a very casual culture, a lot of lateral communication. The only strange thing—there's a small executive parking lot. [*laughs*] I felt a little weird about that, because that was not the Apple way.

I think what's somewhat different, and a little bit refreshing, is that at this stage of the evolution of Valley culture, there's very little loyalty between companies and employees. It seems like a bygone thing—everybody's looking for the next gig, and the company's looking for the new people. That does, I guess, produce responsive organizations that turn around very quickly, and it produces people that are always thinking about "How do I stay on the edge?"

This gets kind of exhausting after a while.

Exactly. And I think one thing I found refreshing with CompuServe is that there does seem to be a little bit of mutual loyalty in the culture, which is different.

So where do you see online services in general, and yours in particular, going? In that market, the world has changed almost unrecognizably in the last year, even. Ordinary people are getting online in droves. The Internet is suddenly mainstream, and people are coming in from that direction. Microsoft has not only announced it's going into the online business, it's in the process of acquiring Intuit, which must be causing the guys at H&R Block to go "Cowabunga!" [*laughter*]

We certainly don't take that acquisition as a friendly move! [*laughs*]

I think you've already hit the main issues. I'll add a couple more in there—the actual and potential increases in bandwidth to the end-users; the kinds of technologies that makes possible; the worldwide scope of not only our service but the Internet, so that we've now got different physical-world cultures coming face to face in the nets. All of those are things that are very interesting right now.

Although I should hasten to say that as in most popular phenomena, the pace of change is a little bit exaggerated. There's no disputing that the Internet is probably the biggest driver now in terms of change, simply because of its sheer size, its growth rate, the degree of standards it's causing to spring up throughout the world. TCP/IP is sort of the literal backbone of the Internet, and we've responded to that by going into the IP access business.

You can see other standards coming along—the Web is one to be dealt with as well. I think that ability to go out and interoperate between systems that weren't planned in a monolithic fashion is probably the most profound change that the Internet is pointing toward.

Up to this point, commercial services have been their own isolated little worlds, and you might have had ways to go out, but they had their proprietary interface and proprietary content...

And one thing I'll say is that's probably not going to go away. I think that in-a-bottle, totally proprietary approach needs to go away over time; but there are a large number of people who, for whatever reason, want a unified view of what's out there, whether it's Internet or other sources of information.

Part of what's going on on the Internet is that we're in one of those situations where the rising water lifts all the boats. All the brouhaha about the Internet has generally warmed the market for all of us. I'm sure it's true of [AOL president] Steve Case and the folks over at Prodigy as well as us—now that there's a big buzz about Internet online, we don't have to go out quite so much and educate the market.

PCs are becoming pervasive as household appliances—Steve Jobs' vision is now coming true. And a lot of people open them up after Christmas and say, "Oh, what's this CompuServe thing?" "Oh, I heard about online, I'll give this a try."

So there's a little bit of pre-education going on.

Then, being an old Apple person, I recall something that Apple did once upon a time, which was to put Macintoshes into the universities at a very low price.

Steve Jobs was a wily dude.

Yes. Steve was a fox. What was going on there is very obvious at this remove—those guys were about to graduate and get salaries and positions of influence in business. I think part of what's going on now with the Internet is

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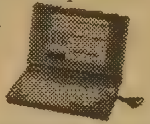

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that we have all these people sitting in their dorms and their labs, and they have whatever rate—T1 and down—access to the Internet, and they're about to graduate, and some of them are going into businesses, and "I want my Internet!" There's another demand driver as well.

All that, in terms of warming the market, stimulating interest, is probably good news to us, both at the consumer and business level, as long as we're willing to go with the flow a little bit and work with the Net the way it needs to be worked with. The values we've got, which are basically consistency, bringing together a number of offerings in one place, providing a somewhat more safe playing field—those don't go away because you're changing your base of technology.

So I would have to say that if we or our two major competitors played like dumb elephants and sat there, we would indeed be in grave danger, because eventually the Internet will allow one to have a basically free market of specialists, who can attack any particular component of any of our businesses. But I don't think you can look at what any of us are doing right now and say that we are failing to understand that message.

CompuServe is still the king of the online hill, though your competitors, AOL in particular, are quite aggressive. How would you differentiate CompuServe from your chief competitors?

Right now, yes, we are the largest in terms of number of accounts. One of the other things we have is international reach at this point, which our competitors don't.

The other thing is the type of services we offer. We've largely tended to specialize in things like large technical support forums—we've got a very large technical community out there. Financial databases. We're moving into the more entertainment-oriented areas, but in terms of people that are solid longtime online users in those categories. Those are the people that tend to become the loyalists.

Of course everybody that looks at online—whether it be us, AOL, The WELL, or whatever—knows that the ones that talk to each other are the ones that stay. I think what you can say about CompuServe is it's got the most viable and vibrant communities that are interested in things like technology, like finance, like a number of strong hobbies. I for instance hang out in the genealogy forum—it's one of the strongest areas out there in cyberspace for doing that kind of thing.

I would say that simply the breadth of offering and the robustness of the communities that have built up over time are some of our biggest assets going forward.

How does the relationship with H&R Block work? Do they have a significant presence on CompuServe?

Not a large one, but we have done a number of services for H&R Block to support their tax business. For instance, we run the computers that do their electronic filing. They file it over our network. Some of our folks will go out and help them do things, like configure the standard PCs that they're going to use for tax prep in the Block offices.

One of the more interesting things we've started doing with them actually centers around the unit called H&R Block Financial. We have a CompuServe affinity VISA card issued by that division; what we have on the service is a place where you can check your statement online any time you want. So if you have a CompuServe VISA card and you have an account with us, and you have any doubt whether something has hit your bill or whether you were billed accurately, you can just pull the statement up online.

And, as the press has noticed, Block also owns the Managing Your Money product. Which, just as Bill Gates felt that Intuit was a fit-together for an online service...

Let's talk about that—it doesn't take too much imagination to see CompuServe and H&R Block going into online transactions and finance in a big way, and regarding this move by

The .GIF Situation

So Tim, what's the deal with .GIF?

I'll just give the top-to-bottom recap. Some time ago, CompuServe designed this file format called .GIF, which is basically for rasterized graphics, 8 bits, and so forth. It included a compression technique called Lempel-Ziv-Welch, LZW. It's a lossless compression technique to make smaller data out of bigger data by reducing redundancies, which is what you want to do with large graphics so you can send them across the line more economically.

This thing took off very nicely, one of the reasons being that CompuServe disseminated it to a large number of developers—people that were doing client software for the service, graphical client software, developers of graphics tools—and generally just made it available. We kept the copyright to the spec, but made it available basically to all comers. There was one revision of that in 1989 that added a number of features.

The rub is that unbeknownst to the original developers, LZW was under a patent held by Unisys Corporation. One of the issues is that we, and apparently a number of other people, found this technique in a journal. It was published without any disclaimer at that point saying that this was subject to patent. It was basically incorporated without that knowledge, and lo and behold in 1993 Unisys shows up saying, "We have this patent and you have infringed it."

When it came right down to it, CompuServe felt that it had to settle. We had a very large number of pieces of software out there that were using the technique, and a large number of developers had used it in good faith as well to develop their own tools, their own clients, and so on. So we basically reached an agreement with Unisys in the middle of 1994.

As part of that, there was a stipulation that there was a fixed time window in which we had to reach an agreement on a license that we could pass through to our developers. We felt we had to do that, because again, they'd used it in good faith, and they needed to be protected against any possible damages from that use, and we had to make sure that they could still continue to do business.

And your developers are who?

Developers are people in several classes. One of them is people that are producing client programs to CompuServe that aren't our own, for instance Navigator, TAPCIS, and others that use our technology. The other class is graphics developers—there's a large set of graphics forums on CompuServe for these people to congregate and talk about the tools they're building.

We were able to reach an agreement with Unisys that said for a fee, we could sublicense to the developers that were doing something clearly attached to CompuServe. There's a per-copy license fee that is for the most part a passthrough—there's some that we take off to cover our costs of administering the program, because up to now we didn't have a licensing program. This is not particularly a business we ever wanted, but we're now going to have to run a licensing business.

So you're not charging for .GIF, you're just recouping your costs.

Administrative costs, basically. We're going to have to hire a couple people to keep the books on this, which is more of an aggravation than it's worth.

But you're not making money on the deal?

We're not making money on the deal, and if we find out we are, we'll cut the fee, because we made a commitment we're not going to profit from that.

So we negotiated this passthrough, and the rub for a number of people, a great concern for the nets at large, has been that we've been unable to secure a passthrough that we could take to developers off of

continued on page 137

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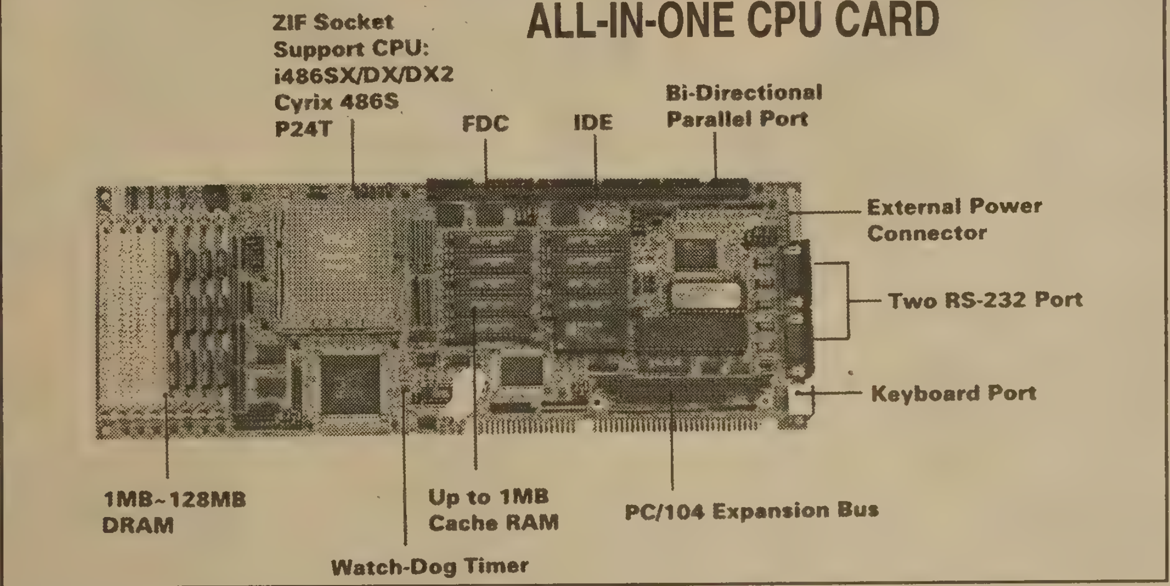
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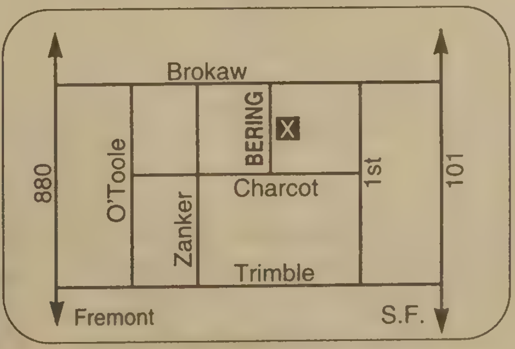
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> What we're already seeing, and I'm sure PC manufacturers are seeing the same thing, is that there's a younger group of people moving up and beginning to buy machines, go online, that grew up with game machines. They never knew a world without Pong. Or even Mario for that matter.

Microsoft with some trepidation.

I think you're right to say that there's an obvious fit there, but I'm not going to use this particular time to say too much about exactly how we're going to exploit that! But Gates isn't the only one who figured this out.

That in turn raises issues like those being presented at this conference, in terms of security.

Mm-hm. Security, and as you said, transactions. Because, as they're also discussing at this conference, security encompasses a lot of different concepts—everything from passwords to prove who you are, up to securing transactions, card numbers, things like that, and on up the gamut to full privacy.

That's one of the reasons I'm here paying attention to this. On the looking-to-our-customers side, what will they need in the form of proving who you are online in the future? What will they demand in terms of privacy four or five years out? Then looking backwards, as it were, to the financial institutions that we'll be working with: What kinds of technologies are they signing up for, to make sure that the transactions they get off of our type of systems and the more open Internet systems, are in fact valid and reasonably fraud-proof?

It's quite obvious there needs to be industry consensus over what those are, just as the banks right now have a wide variety of competitors doing credit-card clearing. VISA itself, merchant banks, credit-card clearing operations all do this, but they all interact around common standards. That's one of our service—Web developers and people that aren't clearly doing something associated with CompuServe. I think that's part of what's caused a great deal of concern, other than just plain there's dollars involved now, and before it was basically free to all comers to use this.

So the Adobes of this world have to go to Unisys and make their own deals.

Yeah.

There's some things in the whole issue that need to be made clear. One is, we still are not claiming any rights to the .GIF spec. The only rights at issue here are the patent rights in the LZW. So if somebody's off our service and feels they may have an infringement issue, they need to go talk to Unisys, not us. As far as we're concerned, they're clear.

The other thing that's gone around on the nets, that I think has been pretty well refuted but needs to be said explicitly, is that somebody who's an end-user that has .GIF files, whether they're stored on a hard drive or you're transmitting between them and a bulletin board, or even on a Web server, is not infringing. They basically own a piece of data that was processed through something that embodied that invention.

It's just as if somebody had a bunch of coffee that they'd ground up in a coffee grinder that unbeknownst to them had infringed a patent on the mechanism. You as the end-user are not infringing. And even if you yourself compressed or expanded the .GIF, if you're operating a tool that you bought from somebody that either has, or even hasn't, licensed the patent, you don't have a problem.

Your developer may have a problem. They may need to go talk to Unisys, or if they're doing it in conjunction with CompuServe, talk to us.

The end-user has not got an issue here. You can download .GIFs until the cows come home, and you are not an infringer, and there is no such thing as a tax.

You can put .GIFs in your Web page?

You can put them in your Web page, because even if, for instance, you ran Photoshop and compressed it and put it in your Web page, because you're operating a piece of code that somebody produced, you're okay. Not a problem.

There's a legitimate issue in terms of people that, for instance, are writing compressors or decompressors, import and export modules, or tools that primarily deal with .GIF. They need to talk to their counsel or decide themselves that they need to talk to Unisys.

And that, undoubtedly, is what has caused the legitimate part of the furor out there, other than the misunderstandings.

I ended up out there talking on the Net. Credit's due to a number of people, some of them being members of my own team that were already observing some of the Web groups because of our interest in that, but also Tom Mandel of SRI [and AOL's *TIME Online*] and Kathy Medich of CommerceNet, who called me up and said, "I think you've got a problem."

They were quite right. I had a problem. [*laughs*]

From what I saw on The WELL it was boiling nicely by the time you got there.

Yes, well, we were about twenty hours behind the curve.

Let's say the release of the information could have been handled in a somewhat better fashion. [*laughs*] It happened the way it did due to an approaching deadline due to the original agreement with Unisys, but that probably still doesn't excuse that the announcement was put out over the holidays with no explanatory statement. That plus a certain amount of misinterpretation caused the big flap.

And then I basically got the permission of my CEO to go out there and talk about it, to the extent that I could clear up what was fact and what was not fact. Then people could decide for themselves what was the big issue. Generally the Net was extremely courteous; for a little while I felt like I was going to have some sympathy with Andy Grove, [*laughs*] but for the most part people were very polite.

I got a certain amount of mail, which actually ranks in the dozens, not the hundreds or thousands, of messages, and almost all of it was polite inquiries, good suggestions, requests for more information or clarification. Some flames, but I know how to delete them. [*laughs*]

By now the discussion on The WELL seems to have devolved into how to rewrite the spec so it doesn't use LZW.

Right, and we're watching that discussion, on The WELL, on our own graphics forums, on the Internet. By the time you actually print this, we may have been able to respond to some of that, because there's been some very helpful suggestions out there, not only technically but in terms of possible legal approaches. I've got a technical team looking at the technical suggestions, and our legal people are reviewing some of the other issues. Maybe there'll be some solutions coming out of it.

Actually we were already looking at what it would take to produce the next generation .GIF, so I think it's safe to say that that's going to get accelerated and we've heard a great deal of input that would be useful in that.

One of the concerns we've got, for the good of not only CompuServe but the whole community, is that this doesn't turn into something that fragments the graphics standards. One of the beauties of .GIF, because it was made pervasive early on, is that everybody started using it. So if we had to put five different little standards that each do something a little bit different, some of them optimized to avoid the patent, some of them optimized to add features—there's lots of reasons for not wanting lots of standards. So we may find it in our best interest as well as those of the developers to try and converge that whole process again.

Making darn good and sure this time that we don't inadvertently stick any patented technologies into it. [*laughs*] Or at least make sure that if there are, they're all bought out at the beginning.

Because we don't need this one again.

One other thing about future standards. One of the things that everybody involved in this has got to realize is that for us industry insiders and the like, this is a big deal. For most of my users and many of the Internet end-users, they won't have heard of this, they won't understand this, and if we're going to get them to change, they have to see some benefit.

If you weren't actually monitoring this business and somebody said, "You really need to take your Photoshop and throw away your .GIF import and export and get something new"—why should you bother? You need to see some benefit out of that.

So I think that's part of what needs to be taken into account in doing some further design, as well as making sure that one's well clear of the whole patent thing. At the end of the day, the person that's actually paying the bill for the software or service has to see a benefit or they're not going to change. And then you end up back in the soup, fragmented, staggered across two incompatible standards. There's been a number of creative suggestions also made out there as to how one could avoid infringement but still maintain some form of data compatibility. We're looking at that too.

It'll play out. I think that at this point people have kind of realized where the technology and the legal issues actually are. Now the question is, How do we respond to all of this in a fashion that doesn't leave the user community sort of wondering what happened?

It would help if the patent office were a bit more forthcoming about this sort of stuff.

It would help if there were a much more public way of disseminating that type of stuff—maybe this whole THOMAS thing gives the indicator of where the patent office ought to be going in terms of open disclosure and easy search of what's out there. ■

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the big paradoxes right now for those of us that want to be out ahead a little bit in terms of anticipating what could happen in the market—to figure out what those standards are.

It's like fast modems—the early ones have all kinds of weird incompatibilities that disappear by the time they hit the mainstream.

Well, we may have a better chance here in some regard, because the modem manufacturers of course were moving as fast as they possibly could, because that's a cutthroat business right now.

I think in this case, we and, for instance, our other partners in CommerceNet are far enough ahead of the demand that we've got some possibility of sitting down and making some sensible choices in terms of interoperability and standards.

Speaking of CommerceNet, what is that?

It started out here in Silicon Valley due to a modest-sized federal grant to try to put together one of these technology reinvestment things. Part of what they started doing was pulling together various classes of companies that might have some interest in doing business on the Net, the open network, as opposed to, for instance, a private EDI network.

That covers a wide variety of possibilities, so there's discussion of everything: "Let's do EDI in a provable fashion real-time," "Let's think about some of these security problems," "Let's worry about how to pass the credit card information around." It's become sort of a meeting ground for industrial partners, or possibly competitors, to get together and talk about some of the standards issues that may arise.

It's also turning into a hub for various trial activities. Trial is basically "we're going to turn this on and see if it actually works," versus sitting around and writing a lot of specs and having standards meetings. A little bit more, if you will, the Internet approach—"if this works, and if people seem to like it, then we'll run it up the flagpole."

So far I think the biggest positive contribution it's made is to assemble a number of people that are looking very seriously at the Secure HTTP standard, a further extension of the standard behind the Web that would allow for some selective security and privacy, so that you could do things like prove who you are on the Net and pass around your VISA number.

We're also working with a couple of Columbus-based companies, BankOne and Sterling, to see if we can put together a trial of this technology, with the intent of saying we could do one sample business end-to-end. Outside of Silicon Valley, Columbus is the biggest hub of CommerceNet activity, so one of the things we're trying to do is assemble a critical mass of companies in that geography, just as there is one out here. So we may be C-Net Midwest or something like that.

What's EDI? Electronic Data Interchange, but what does that mean in real life?

What it means is that you're sending around something called transaction sets. It indicates commercial deals. So for instance, suppose I'm a cataloguing company. I don't hold stock—what I'm really doing is merchandising the stuff and sending off orders to my suppliers to drop-ship to my end customers. There's a number of very large cataloguing companies that do business that way.

How do you do that? Formerly what you did is sent around a blizzard of faxes and paper to pass the orders around. What you might do with EDI is, when that order comes in, you type it into this electronic order set and boom!, it goes over the wire. And then they run off a batch of stuff and their warehousemen go out and deal with it, but paper doesn't move.

That type of thing is widely done in industry at this point. We carry some of that on our value-added network. There are specialists at it—Sterling Software, which I mentioned earlier, is a specialist in that market. One of the implications of this is, "Gee, if you can do this for fairly large-scale businesses, small-scale businesses are coming onto the big nets—maybe they'd like to be able to do that too." That's the potential there.

However, you can't say we're going to operate this over a totally closed network, because that kind of breaks down the premise that led them online to begin with.

This is pretty much something that operates between businesses rather than individuals, then?

That's a business-to-business function. Some of the other things that CommerceNet's looking at are the standards that would be used in terms of communicating between the end-users and the businesses, perhaps even between the end-users. Getting back to the issue of "How do I know my credit card got across the Internet without getting filched?" and "How do I know I was really talking to the guy's server, and how does he know that it was really me?" There are a set of issues like that, that when you're no longer connected more or less point-to-point on a private network like our own, you have to settle electronically and provably. That's really what this RSA conference is about—the sustaining technologies for that.

So far online transactions for individuals have been things like home banking, which has been a total fiasco. What needs to be done for it not to be like home banking—i.e. utterly useless?

Good question. [*laughs*]

For the banking part, you'd have to go ask the banks.

I think it needs to become pervasive. We're seeing that happen right now.

What do you see driving that?

I think it's back to the same thing—the PCs that are the points of access are now becoming widely enough pervasive in our society that I think the connected PC may soon pass what I call the fax point.

You remember when faxes were scarce, and it was an oddball thing to have on your business card? And suddenly, within the space of a few years, there were enough of them there that you wanted it on your business card, and the bottom dropped out of the price. Suddenly it was a business and social faux pas not to be able to give somebody your fax number.

For a certain class of people, we've already passed that point in terms of email. I think we're starting to get to that point in terms of some families, for instance—if Mom really wants to hear from me, get an email address! There's a big driver that says that people will go onto the wide nets for social purposes. And once they're there, then they're going to want to do transactions.

I think one of the generic mistakes that's been made with things like home banking, and potentially is being made in some of the visions for interactive TV, is that the urge to transact is not that far up there in terms of end-users' and consumers' priority of needs. Somewhere up above there are certainly the urge to be entertained, the urge to communicate, and maybe some other things. Those will become pervasive before transaction becomes pervasive.

My paper Land's End catalog works just fine.

Right, and you can drag it around to places you can't take your Mac or your PC to. Yes, we are getting small portable devices, but using those things hour-in, hour-out is a good way to put your eyes out and run your bill up to the sky. There are some things the old media are going to continue to do just fine.

Going back to home banking, there have always been two things that struck me as sort of stupid about it. To me, it's not nearly as useful as an ATM machine because an ATM machine will give me cash, and you'll never get that from home banking. But the thing that's more fixable is that initially at least, the banks were attaching obscene amounts of float to it. Until it's at least as real-time as an ATM, what good is it?

Right. This is classic marketing. With anything like this, you're going to have your early adopters. And in this case, home banking, they're going to be people that are very technically savvy, and probably smart enough to figure out some of those issues like float.

If you look at what's actually happened, what things *have* moved online that amount to transac-

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tions at this point—you can get this thing called Street Smart from Schwab. That's your most sophisticated set of users, and they're doing very high-end transactions. This is not stuff, at this point, that you do off of an ATM. They've got themselves a win there, because they've said, "What would a savvy early adopter actually *do*, and what will help my business in terms of driving demand there?" They didn't go off in the direction of "Everybody's going to pay their power bills with this." They started out with the sophisticated users and got a market fit there.

I think that other stuff does lie down the road somewhere, but it's after the point where things like email become pervasive, when it becomes commonplace to say that I went on the Net and chatted with some interesting people last night, and everybody understands it.

The Bay Area, being a hub of sophistication about this, is probably well along that curve, and probably a very good place for looking at the effects. When you can go down the road out here and see email addresses posted on the billboards, which I've seen, it says that for this community, email has passed over that fax point in terms of adoption.

When you start seeing it in the literal Peoria, then you're there. And at that point you've probably got to where home banking in its most general sense becomes a viable proposition. But it's going to be those other things—the urge to be entertained, the urge to communicate—that's going to drive it.

Where do you see the cable companies fitting in with all of this? It's very interesting to watch the culture clash, but hard to figure out where it's going.

Well, it is. It seems to be less an issue of technology and more an issue of the proverbial industries in collision and the uncertainty of regulation.

Just to put together a number of possibilities—what about DBS, digital broadcast satellite, the little dishes? They're selling like crazy. The cable companies call them Death Stars.

The reason they're worried about it is not because it's going to soak up the rural market, because they can't reach that market anyway. It's that it might soak up their premium users.

For those people that are able to put six or seven hundred dollars up on the table, which by definition is a high-end consumer and a premium user, they have the possibility of now switching to another carrier. So what's the possible effect on the cable companies?

Cream-skimming.

Exactly. It's their premium user, the one they'd like to move upscale to use interactive services. They might be taking off in one direction.

On the competitive side, one of the ways the cable companies are going to have to raise capital is based on their cash flow. If you're in the financial community, that's how you value a cable company—you look at the number of subscribers and the average take per month per subscriber and you do a big multiplication.

If DBS continues to be a hit and it's not just a flash in the pan, one of the things that's going to happen is that it's skimming the cream, potentially, off the cable companies. First it's taking the rural audience, which is okay because they can't reach them economically anyway. But if it takes the cream of the premium audience, the people that buy the movies on demand, do the interactive shopping, buy the Pay-Per-View, then what you've got is that the big-margin stuff of the cable companies goes away, which affects their cash flow, and also affects them in that it sort of removes potential audience for some of this interactivity. That could have a big negative effect.

If your audience is poor, they're not going to go home-shopping.

Exactly. They're not going to buy as many movies if they're really sensitive to the price point and how much is on your monthly bill. It means more of their revenue comes out of basic cable, and guess what, it's regulated and low-margin.

On the other hand you've got the possibility of the phone companies coming across the line. Right now there's enough uncertainty and just plain prohibition in terms of federal regs and so on. If that barrier went down, telephone industry money applied to the cable industry would be one of the accelerators, if they could figure out how to get a return on it.

Will the barriers come down so that they can easily cross-invest in broadband? In that case capital flows toward opportunity, right? Suddenly you've got phone companies buying cable companies wholesale instead of small-scale, and they basically end up running two channels in parallel. Because they can clearly capitalize the rebuilding of the backbones if they're allowed to do that.

If that doesn't happen, then you've got a roughly $80-billion industry, the phone companies and all the telephony applications, at war with a $40-billion industry, cable and the like. That's what really counts right now. All this interactive data and online services and the Internet is a very small piece compared to that major combat.

When it comes right down to it, the cable companies care more about delivering telephony, and telephone companies care more about delivering video, than either of them care about data to the home, because it's Willie Sutton again—where's the money? Look at how many zeroes are after the leading digit. Telephony and video is a big deal; the stuff that I'm involved in right now is not so big a deal.

But depending on who wins, there may be a tremendous effect on what people are actually able to bring down to the PC.

One of the biggest problems right now is that the cable companies, or more appropriately their suppliers, are using incompatible architectures. There may be some statutory requirement at some point that they have a standard for, say, doing video dialtone, or whatever the equivalent is, but for the most part, how they modulate their signal, the protocol stacks they run, the signaling conventions, are very dissimilar from one of these to the other. That's probably as it ought to be right now, because we're still working out exactly what people are going to pay for. When you figure that out, then you lock in a standard architecture that delivers efficiently what people will pay for.

The problem, from the point of view of somebody on the PC side, is: What if I have a customer who says, "I love this idea. I want really high bandwidth. I'll go over to Fry's and I'll buy my cable modem and I'll plug it in and it'll run great in Mountain View. Oops, I just got a transfer to Denver. TCI territory." A different system. Suddenly it doesn't work any more and you've got a very unhappy customer.

You're stuck there, because the only way out of that is either having an unhappy customer or that you rent it from the cable company, in which case the cable company, of course, will be very cautious in terms of how many dollars they put into that modem supply, because they don't know—it might not work three or four years from now and they might not get their money back out.

So you've got kind of what, being an old engineer, I'd call impedance mismatch, kind of a misfit between the proprietary approach to what's going into the cable architectures and the more open approach of the PC, which is how you get leverage—you do something that plugs into an open standard and runs anywhere you want it to.

One thing that would make my heart very glad—not saying that it will happen—would be if there were some sort of an agreement among the various parties to all this, to say we're going to have to carve out some area of bandwidth in these systems, we're going to standardize on a modulation scheme and standardize on a protocol stack, so I can at least have a happy customer who moves from one territory to the other. That would be a much better fit for the requirements of the PC marketplace.

So far the signs are kind of discouraging, even though people like me are attempting to beat on the cable suppliers and say, "This would make a lot more sense. Then you guys all go out there and compete on the architecture of your settops, the peculiarities and advantages of your modulation schemes, and do it all in the cable area. Compete,

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- KB, DOS, Windows, mouse

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- 4MB Exp. to 128MB
- VLB HD controller, 2S/1P/1G
- 540MB Hard drive
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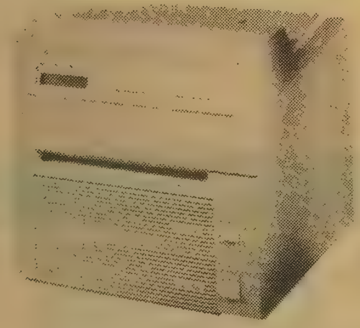

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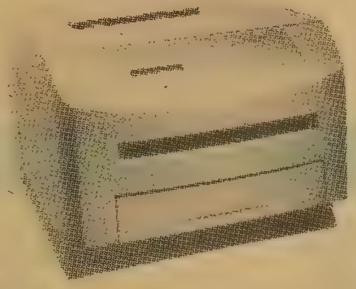

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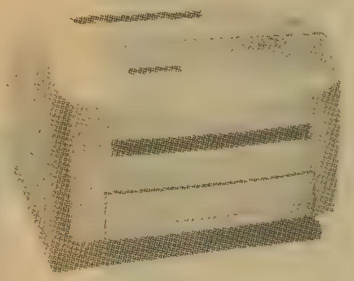

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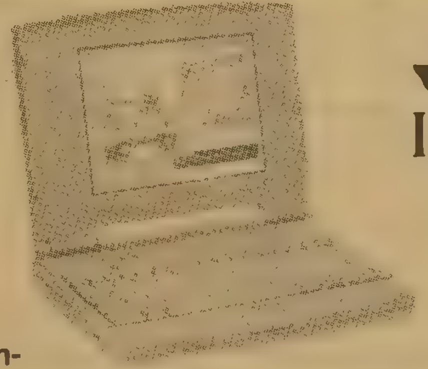

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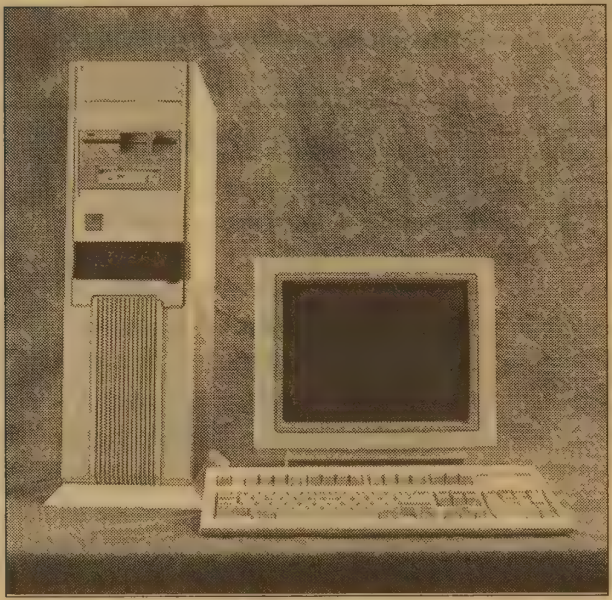
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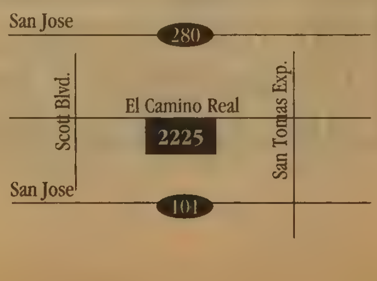

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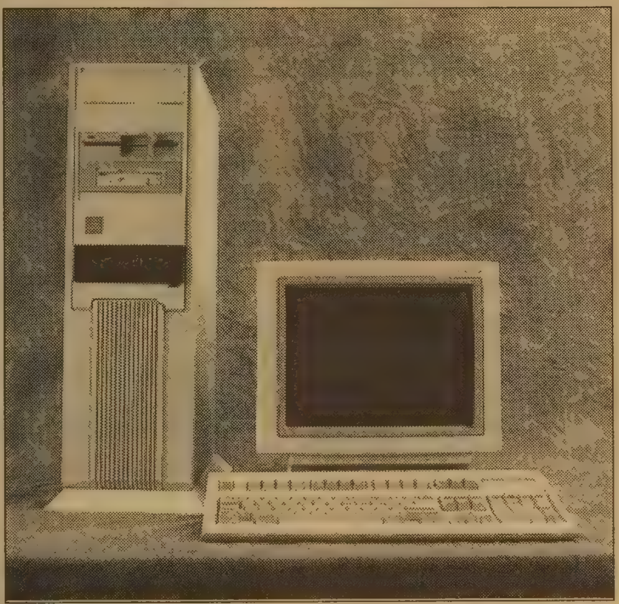

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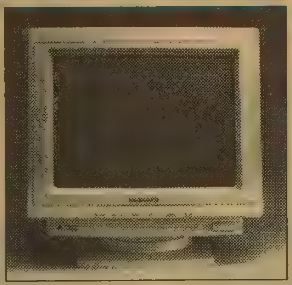

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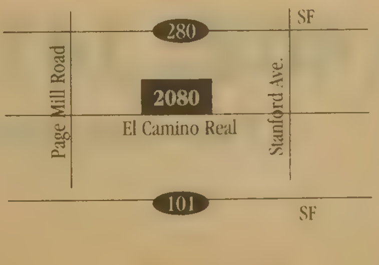

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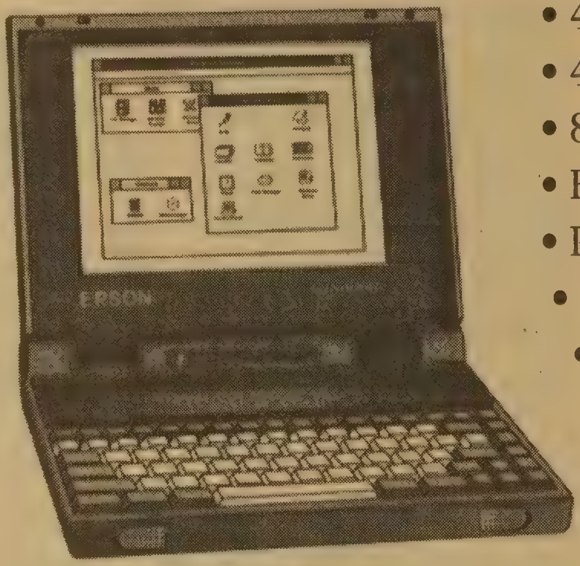

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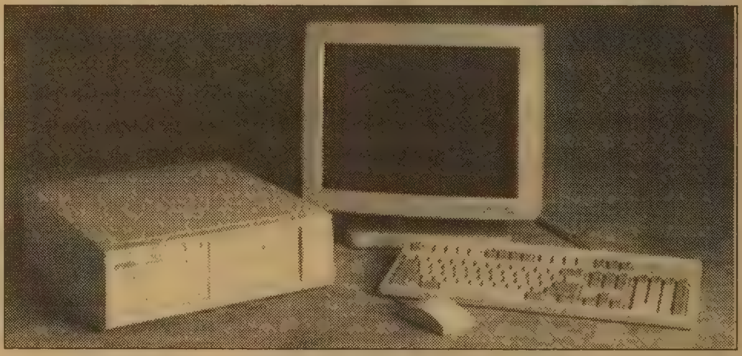

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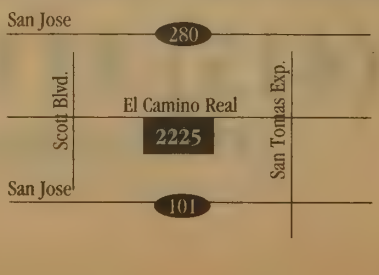

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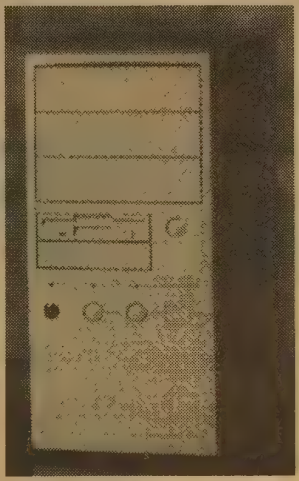

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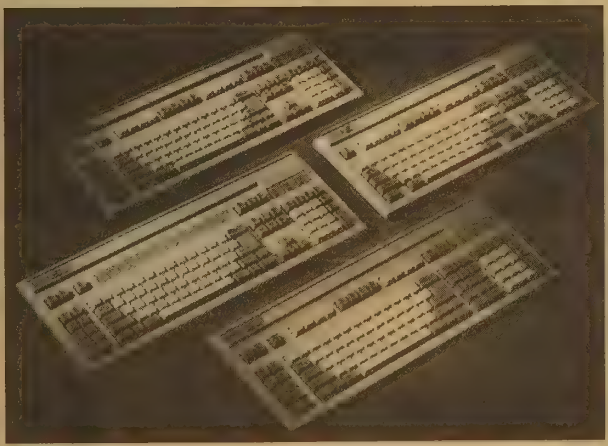

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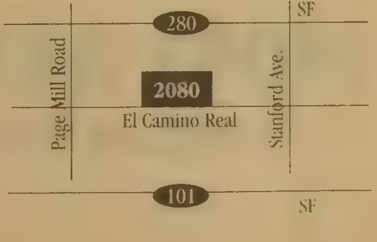

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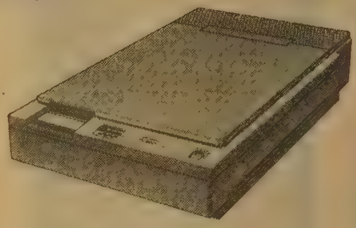

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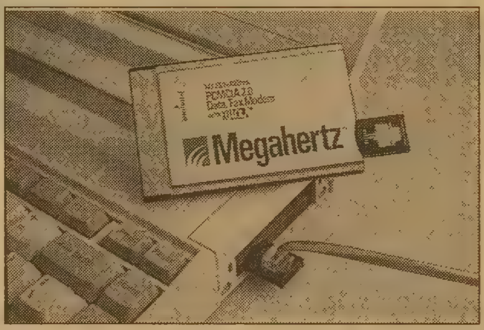

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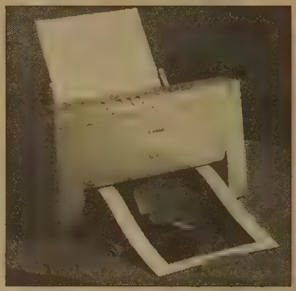

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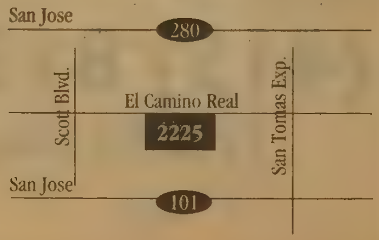

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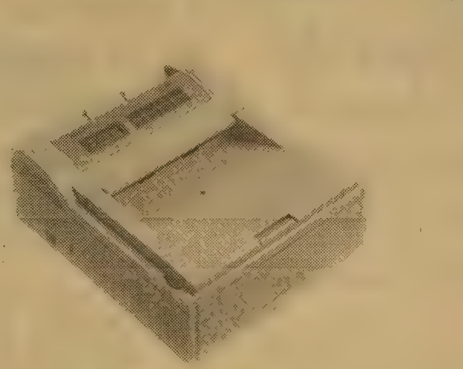

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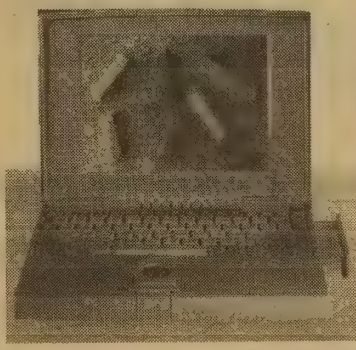

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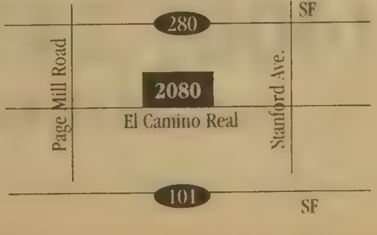

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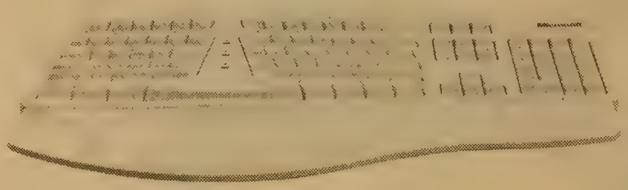

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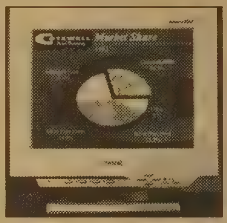

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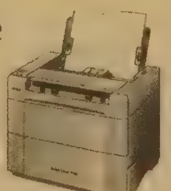

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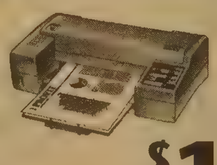

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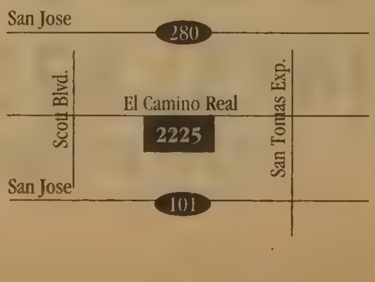

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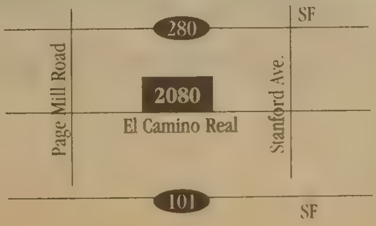

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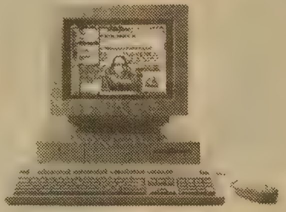

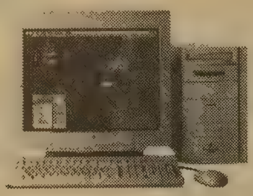

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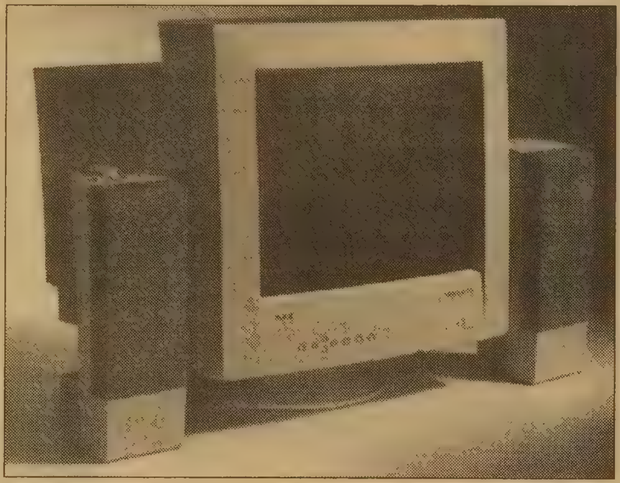

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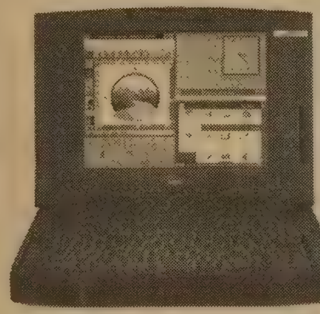

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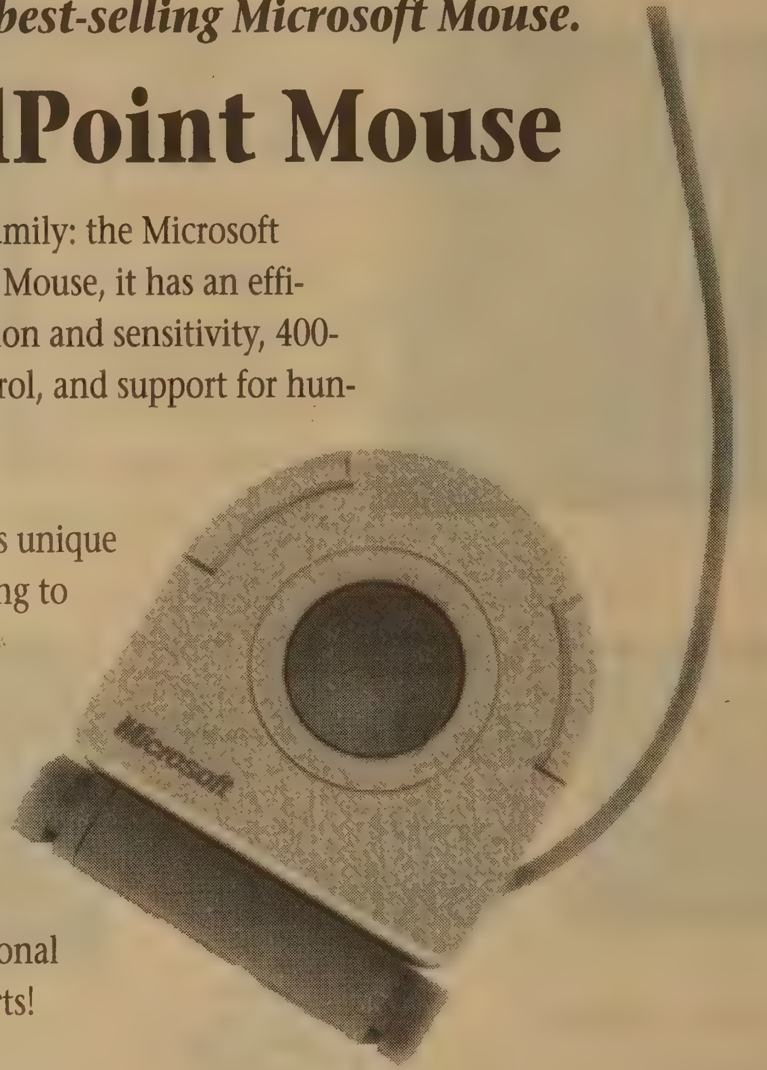

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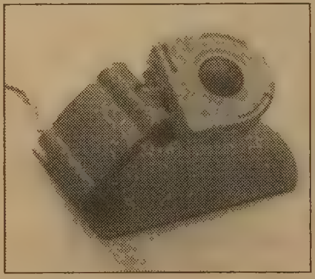

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Small Office/Home Office *continued from page 94*

are there. When I finish my project, I empty the "current" bookrack immediately.

Each day, I look at everything that has arrived. Some things go immediately into the most useful of all files, the wastebasket. Others can go into known folders: The letter responding to my inquiry goes with the inquiry. New information on current projects may go into the "current" bookrack. Software that arrives for review goes into a "to be considered" basket under the desk.

Some things just don't seem to fit into any category, but I am not certain I should discard them. I learned from the wise advice of Pierre Roche de Coppens and Jacques Peze (*The Art of Joyful Living*, the book is called; it is useful for anyone who needs to direct their own life without supervision) that any well-organized office has an "aging basket." Anything whose category is not immediately obvious can go into this basket. Once a week, once a month, or when faced by a writer's block, you can look through the aging basket as if its contents were incoming mail. Some things will immediately go in the trash, some will get files of their own, and a few will return for another round of composting.

Look at everything in the workspace and ask, " Does this directly support doing the job?" If not, it goes.

To Work In Beauty

In building a space for work, it is easy to get in a "just business" mood that creates an overly severe office. You will find yourself avoiding this office unless you are already in the mood for work.

I have found that simple beauty in the office furniture is key in motivating me to work every day. I learned it from my wife, who has always made her workspaces beautiful. I might be satisfied with a plastic in-box, but she would choose a dark woven basket. She would always save up to buy an attractive filing cabinet. Her paper clips went into small Chinese enamelware cups.

By making her office beautiful, she drew herself into it and supported herself while she was there. Finally I began to imitate her, and with her help learned to make everything in my workspace as

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beautiful as I can. There are flowers from the garden three seasons a year, and I can look into them for a minute's refreshment when no idea will come. The pencils are in a cylindrical basket of a rich warm color. I admire it each time I reach for a pen.

This is not an invitation to spend every penny on the home office. It is instead an invitation always to consider beauty when buying or building something for your own workspace.

Space And Beauty, Mediated By Ease

So ten years of home-office keeping have given me these lessons:

Although I began working on the kitchen table, I found that I needed a space whose only purpose was my work. I needed not only to have the space, but to defend it against well-intentioned encroachment. There is a cat draped across the monitor at this moment, but there is no reasoning with cats. She has moved herself into the inspiration category. Everything extraneous I remove. The space is dedicated to work.

Despite a natural proclivity for stacking-to-the-sky, I have found that I needed to create a storage system. It is "filing without obsession." What I need is nearby, what is less important is far away. Anything that comes on my desk ends up in some sort of container, even if it is the "aging basket" for the stuff that I cannot assign at this time.

The object is to make things easy. Whatever tidiness arises is a by-product of my laziness.

Finally, I have found that beauty is always a good investment in the office. The attractive desk draws you to it. The good-looking file cabinet not only impresses the visitor, it helps remind you that your work at home is a well-ordered part of a sensible and attractive life. We do not live just to work, but for beauty. We keep beauty around us, to remind us why we choose to work at home.

The Small Office/Home Office column exists to serve all those who have their business in their own home. Please let us know what you would like to hear about, and share your tips and your stories of triumph or frustration. You can reach me online at *birrell@well.sf.ca.us.* ■

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continued from page 48

The Zaurus is clearly a souped-up descendant of the Wizard line.

the marketplace. Although the two machines are comparable in price, they come from different design heritages; the MagicLink and MagicCap/Telescript were designed from scratch to be parts of a powerful, integrated, high-end PDA environment, and the Zaurus is clearly a souped-up descendant of the Wizard line of organizers (though given the apparent flexibility of the Zaurus operating system, it no longer classifies as an organizer, but as a full-blown PDA).

Unlike the MagicLink, the Zaurus is not part of a full-blown PDA services strategy; it's really a standalone unit which has some capabilities for communications (faxing, a terminal program, a mail protocol), but doesn't have anything like Telescript supporting it (on the other hand, the Newton doesn't have anything like that, either). The Zaurus also seems to have many fewer bundled software applications like PenCell and Pocket Quicken which are included with the MagicLink.

Sharp indicates that they will be releasing a software development kit for the Zaurus sometime in mid-'95, and a number of vendors including Sharp have already announced add-on applications.

The Zaurus is expected to ship by the end of February. From the press release, it is clear that Sharp's expecting to market this to corporate users, although the machine might have general appeal to the same audience that purchased the OZ-9000 series organizers (which, when new, sold for a similar price). I will be writing more about this machine in future columns. ■

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continued from page 89

To illustrate why, consider Chris Crash, an applications programmer who forms an LLC. If Crash personally writes source code that infringes on some third-party patent, Crash can be sued as well as the LLC because the corporate shield generally does not protect an individual who commits a tort, even if that person is acting on the LLC's behalf.

Moreover, if Crash develops software for a client who subsequently sells the software rights to a corporate giant that gets sued for infringement, everyone along the chain who developed and sold the tainted software might be exposed.

Fortunately, the LLC Act parallels the corporate rules such that an LLC may purchase and maintain insurance to indemnify its members, managers, and officers against liabilities incurred in connection with their LLC activities. If your purpose in forming the LLC is to protect your personal assets, you're probably better off buying an insurance policy instead.

In choosing the best form in which to conduct business, a checklist is almost indispensable. Practitioners Publishing Company publishes a "side-by-side" comparison of entity choices, comparing thirty-one different attributes for regular corporations, S corporations, partnerships, limited liability companies, and sole proprietorships. Please see endbar for a copy of this checklist. ■

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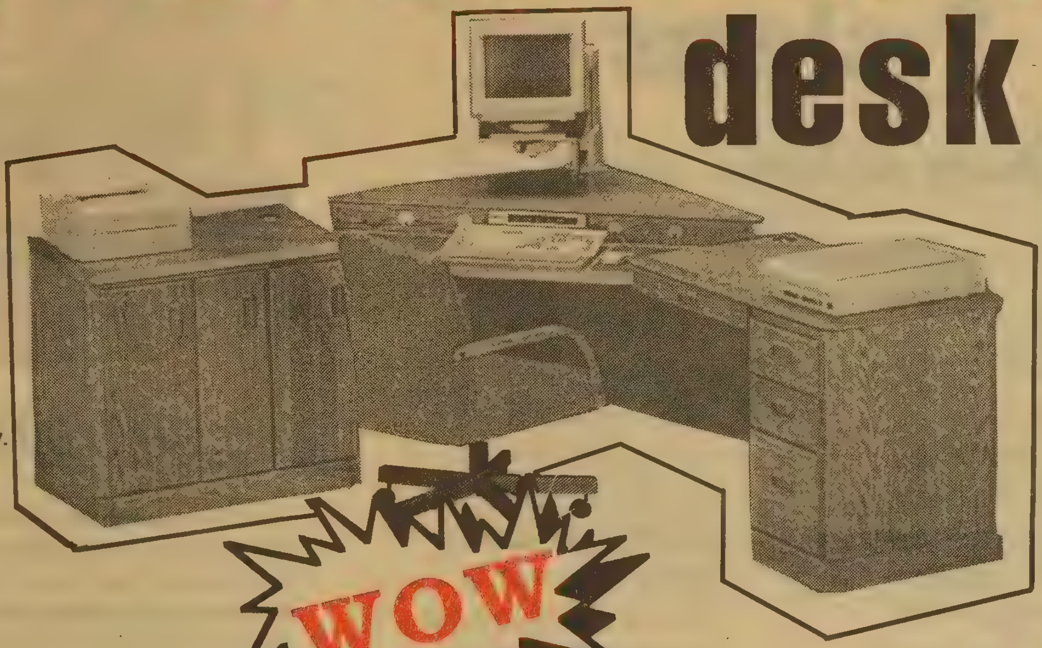

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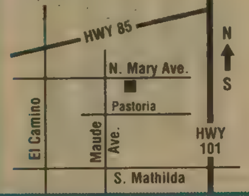

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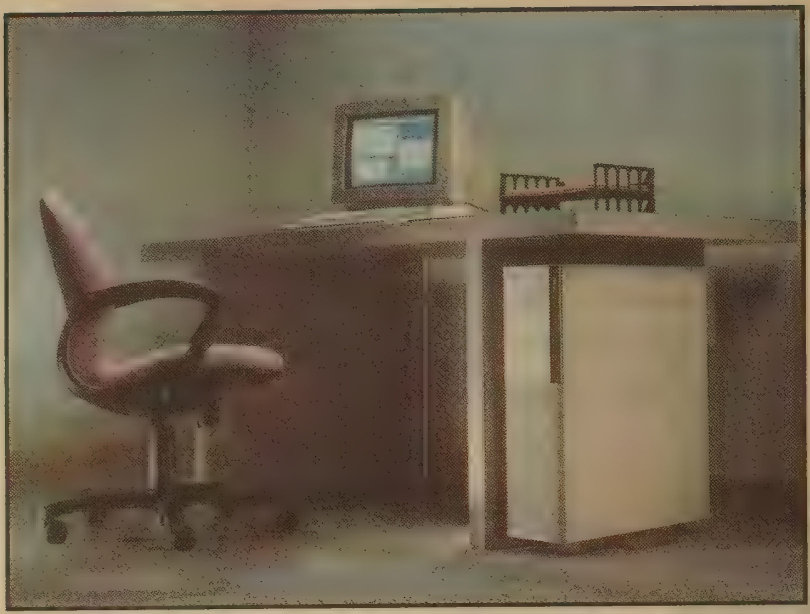

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Telecommuting

continued from page 97

checking up on them, and experienced a reduced level of performance feedback by their supervisors). Finally, some telecommuters perceive (accurately or inaccurately) that their telecommuting will lead to reduced visibility with their managers and, consequently, reduced opportunity for promotions and/or desirable job assignments.

There are likely to be changes in the frequency, spontaneity, mode (telephone or email as opposed to conversations in person), and length of typical work-related communications for beginning telecommuters. Because of these changes, the effectiveness of communications becomes more important. Telecommuters may find that they have fewer but more productive meetings. This makes meetings more valuable and telecommuters are likely, therefore, to improve their preparation for and participation in meetings.

To resolve the "out of sight, out of mind" concerns and to achieve the quality of communications necessary for successful telecommuting, open dialogue about these issues and joint planning between telecommuter and manager must take place. Also, telecommuting schedules should be individually tailored to provide a satisfying balance of time spent at the telecenter and the main office. Establishing core hours in the main office allows the telecommuter to participate in meetings and to have access to main office facilities and resources (including staff support and people resources). Generally, the telecommuting arrangement should address the telecommuter's needs for being informed about projects, advancement opportunities, and events that may occur in the main office on telecommuting days.

Telecommuting is a flexibility program. The telecommuter should remain flexible about the program, especially during the initial adjustment period. This will enable the telecommuter to find the optimal arrangement for his/her personality and job requirements. This will also enable the telecommuter to be responsive to unexpected contingencies which may require a change of schedule.

Energized by their increased productivity, some telecommuters fall into the trap of workaholism, sometimes to prove to their managers or coworkers that they are working hard on telecommuting days. Some telecommuters report feeling a sense of guilt about not being in the main office. The quality of work and family life benefits of telecommuting may be negated by the effects of workaholism. Being aware of this possibility, reminding themselves of the family benefits of telecommuting, and ensuring regular breaks helps telecommuters avoid the tendency to work inappropriately long hours.

Impact on Coworkers: Not only are the telemanager and telecommuter affected by a telecommuting arrangement, but coworkers are as well. Coworkers may have work assignments which involve the telecommuter or which result in workload changes due to the telecommuter's relocation. Some coworkers may feel resentment at not

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having been selected as telecommuters and/or harbor misperceptions about telecommuting. For example, some coworkers may think that the telecommuter doesn't work on telecommuting days, that the telecommuting day is, in effect, a day off work.

Preventing or overcoming coworker concerns, misperceptions, and/or resentment is an important challenge for both the telecommuter and the telemanager. To the extent possible, both need to include coworkers in their telecommuting planning process, provide for open communication between all parties, and keep coworkers informed of the telecommuter's schedule and of any changes that occur in the telecommuting arrangements. The telecommuting arrangement should provide for a convenient means of communication between telecommuters and coworkers. Telecommuters and their managers should be careful not to burden other employees with additional responsibilities such as faxing, copying, or attending meetings.

As part of their adjustment, it is common for coworkers to compensate for telecommuters' absence by increasing the frequency of communications. This increase usually levels off after new routines and patterns are established. Eventually, coworkers are likely to save their messages and contact the telecommuter on a single occasion instead of several times throughout the same day or week. When a coworker is nearby, a problem or question may seem urgent enough to cross the aisle or hall to discuss immediately with the telecommuter. When that same telecommuter is out of the central office and must be reached by telephone, some people realize that the information isn't needed immediately. The physical separation created by telecommuting can be enough to encourage employees to reconsider the need to interrupt another person and recognize when issues that initially seem urgent can be resolved at a more convenient time.

This saving of messages has been cited as a benefit of telecommuting. In addition to decreasing interruptions, many people find the self-imposed delay enables them to either organize their thoughts more thoroughly before sharing them with others, or solve the problem themselves.

Impact on the Organization: There are several significant ways in which telecommuting benefits organizations. These include improved employee morale, improved ability to recruit and retain employees, more effective management, improved job performance, and reduced operating costs (in areas such as facility, facility maintenance, and health care/sick leave costs). To some extent, however, the impact of telecommuting on the organization depends on the culture of the organization, and especially on its receptivity to change. Some organizations will achieve these benefits with minimal effort and resources. Others may never fully achieve them.

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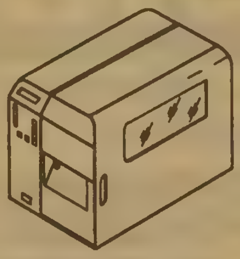

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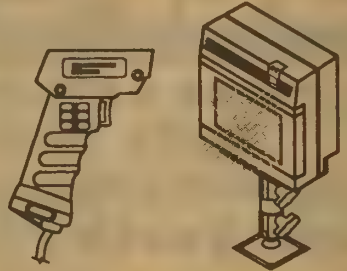

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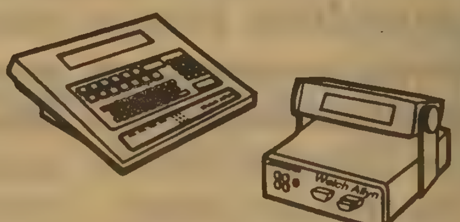

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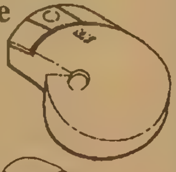

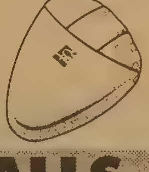

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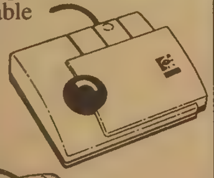

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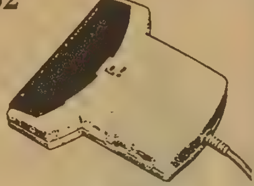

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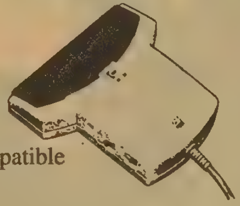

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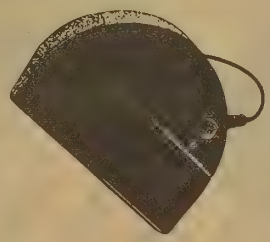

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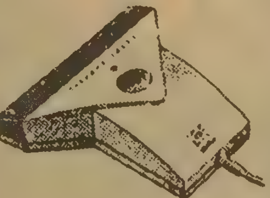

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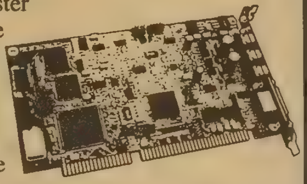

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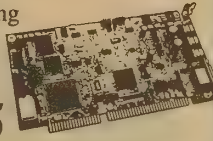

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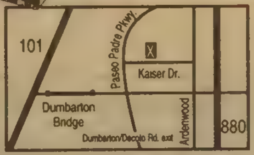

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muting can be difficult. Within such organizations, proponents of telecommuting should be prepared to devote the time, effort, and understanding needed while the organization adjusts to the new work arrangement. As with individuals affected by telecommuting, organizations may need time to adjust to these changes.

Impact on Customers: In addition to organizational, job, and staff considerations, telemanagers and telecommuters need to consider the impact of telecommuting on their customers. The needs and requirements of both internal and external customers should be addressed in telecommuting plans. For example, customers may face long-distance telephone charges or may require new procedures when communicating with the telecommuter. Adjusting the telecommuting arrangement so that it has a zero or positive impact on customer service is an important objective for telecommuting planning. Some offices focus on establishing procedures that seek to make the customer totally unaware of the telecommuter's alternate work site location. Other offices fully inform customers, alerting them to the telecommuter's schedule and location. If done effectively, either approach can provide adequate customer access to the telecommuter.

Impact on Personal Life/Families: A majority of telecommuters report that telecommuting has a positive impact on the quality of their personal life. The benefits of decreased stress, more personal time, and greater job satisfaction for the employee carry over to the home.

Telecommuting may also make it easier to manage and schedule child and elder care arrangements. Experienced telecommuters warn, however, that telecommuting cannot be a substitute for dependent care, although it may make mornings and evenings less harried.

Since the telecommuter is closer to home, family members may see this as an opportunity for the employee to assist with errands or other personal responsibilities. The telecommuter should be careful not to over-schedule.

Finally, for home-based telecommuters, it is important that a comfortable boundary, both physical and social, be maintained between job activity and personal/family activity. To the extent possible, the telecommuter should establish a specific workspace that should not intrude into the rest of the household, and vice versa. Also, the telecommuter should prevent work activity from intruding into personal time and activities, and vice versa.

This material came from *Implementing Telecommuting (Flexiplace), a Manual for the Interagency Telecommuting Program,* prepared by Wendell H. Joice, Ph.D., Cooperative Administrative Support Program, Office of Workplace Initiatives (CW), US General Services Administration, 18th and F Streets N.W., Room 7007, Washington, D.C. 20405, phone (202)273-4660, fax (202)273-4670. ■

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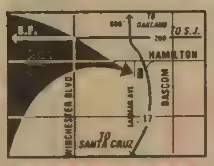
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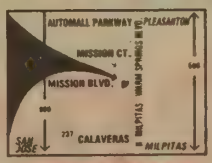
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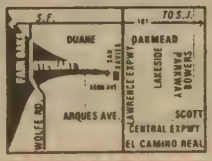
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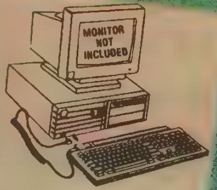

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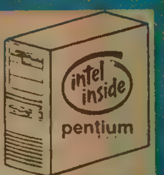

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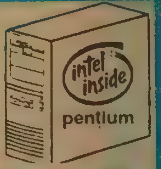

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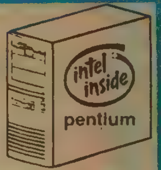

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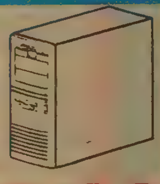

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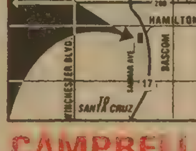

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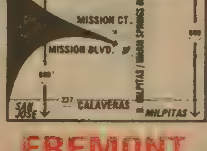

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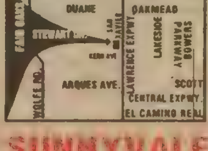

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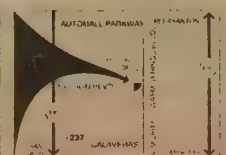

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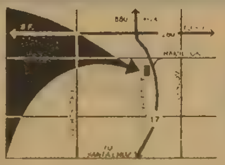

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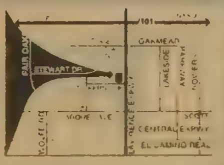

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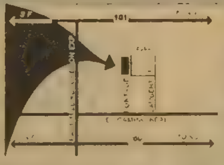

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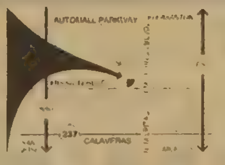

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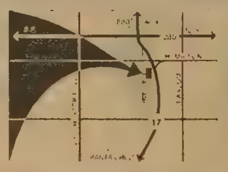

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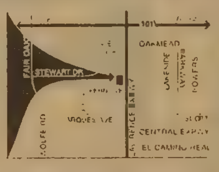

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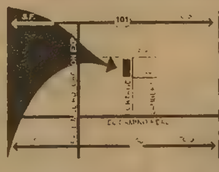

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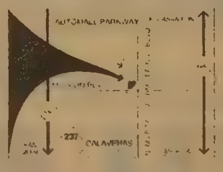

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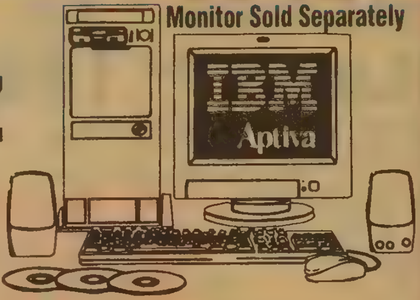

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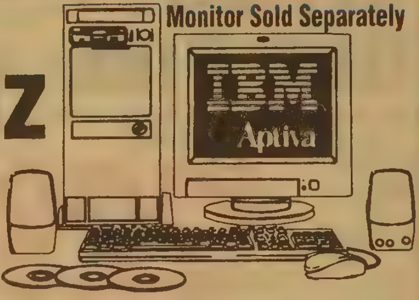

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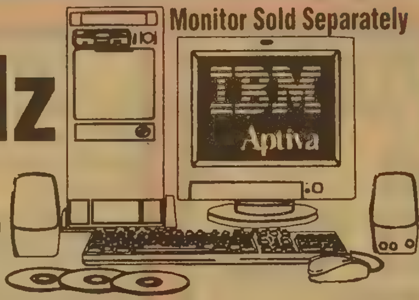

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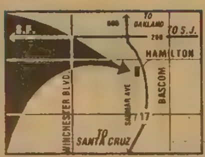
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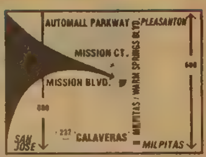
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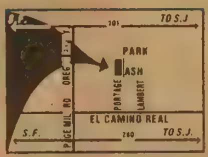
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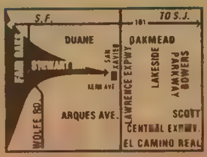
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14,400 BPS INTERNAL DATA/FAX MODEM

Data Compression ITU V.42 bis or MNP Class 5
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- Saves long distance phone costs through faster transmissions
- Improves worker productivity w/faster data transfer and reliable connections
- Protects your investment with a 5 year warranty, backed by AT&T

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GROUP 3 Compatible • 16550 UART
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- V.42,V.42bis, MNP 2-5
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- Includes hardware-based compression and error correction for greater efficiency.

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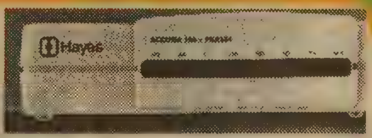

- Free SmartCom Data and Fax Software
- Group 3 Fax
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- Cables included

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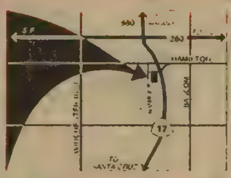

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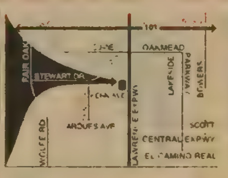

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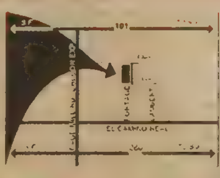

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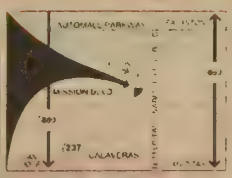

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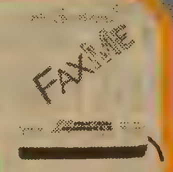

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Includes MaxFax Software from Prometheus
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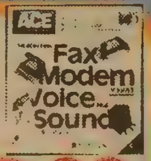

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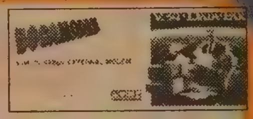
BOCAMODEM V.34 28,800 bps External Fax/Modem



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- High-Speed 16C550 UART Serial Card Included
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- Five Year Warranty

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BOCAMODEM V.34 28,800 bps Internal Fax/Modem

V.34
DATA
FAX

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- 14,400bps Send/Receive Group 3 Fax
- V.42bis Data Compression for Throughput Up to 115,200bps
- High-Speed 16C550 UART Serial Card on board
- Backward Compatible with V.Fast Class (V.FC) and Lower Speed Modems
- Five Year Warranty

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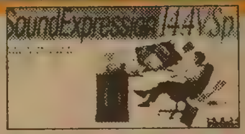
BOCA SoundExpression 14.4VSp



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High Speed Modem Coupler

CONNECTS A PORTABLE COMPUTER TO ANY TELEPHONE EASILY.
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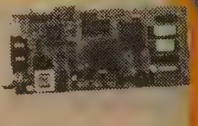

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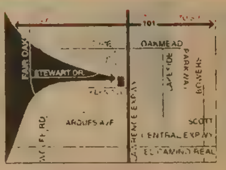

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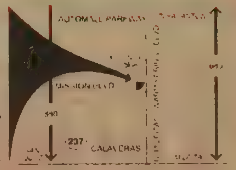

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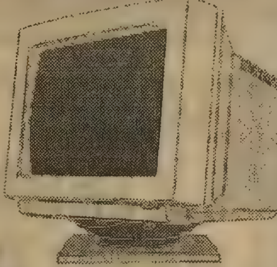


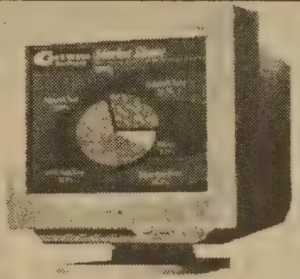
NON-INTERLACED
1024 X 768
.28mm DOT PITCH

14" SUPER VGA MONITOR

One Year Warranty
#1657506

$199

SONY.



1024 X 768
.25mm Super Fine Dot Pitch

14" SUPER VGA MONITOR

MPR-II • Energy Star Conpliant
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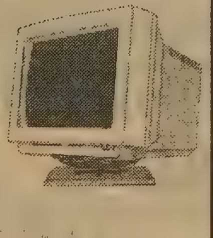
$299

15" SUPER VGA MONITOR



NON-INTERLACED
1280 x 1024
.28mm DOT PITCH
#1983744

$277

SONY.

CPD-15FS
1280 x 1024

15" SUPER VGA MONITOR

15" 1280 X 1024 Resolution • Flat Trinitron Screen
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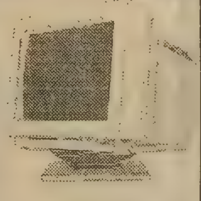

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17" SUPER VGA MONITOR w/DIGITAL CONTROL

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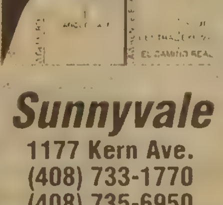

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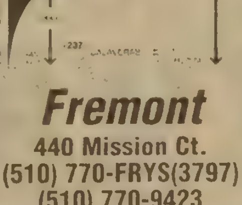

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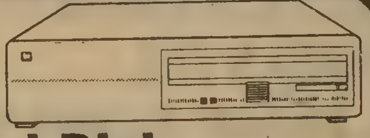
270MB Syquest Removable Hard Disk Ideal for Back-ups!



- Cables, terminator, and formation software included
- 3.5", 270MB cartridge included!

#1979013

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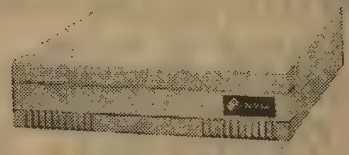
340MB EXTERNAL HARD DRIVE FOR MAC



MODEL 340
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MODEL 210
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540MB EXTERNAL HARD DRIVE FOR MAC

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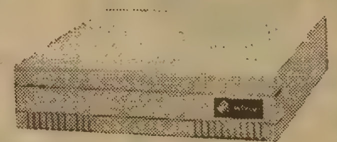

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1.2 GIGABYTE EXTERNAL HARD DRIVE FOR MAC

MODEL 1.2
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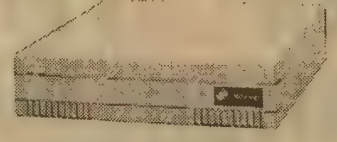

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88MB EXTERNAL SYQUEST
FOR MACINTOSH
Read 44MB Write 88MB Syquest
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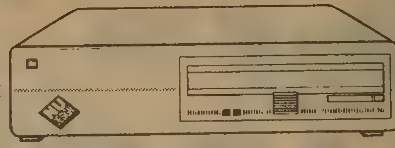

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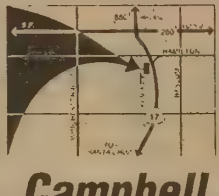
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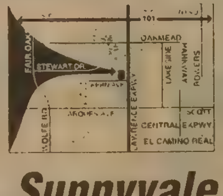
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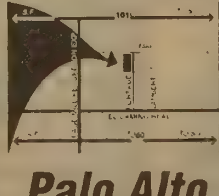
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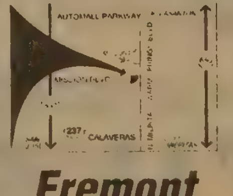
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14msec
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1" SIZE • 9MSEC FAST ACCESS • 256K CACHE
SMALLEST 1 GIGABYTE
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- 9msec Access
- 512K Buffer
- 3.5" x 1" Ht.
- 5 Year Warranty

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12msec Access • Fast SCSI-II
5.25" Full Ht.
One year warranty
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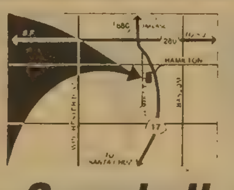
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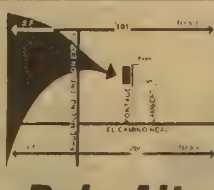
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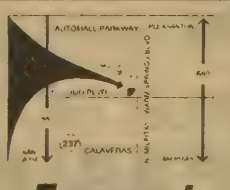
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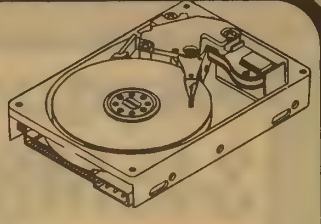
Maxtor



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1" HT. • 15ms Access Time • 345MB Formatted Capacity
MAXTOR 7345A
#1781762

$159

Limited to supply on hand.

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525MB IDE HARD DRIVE

12msec Access • IDE • 3.5" x 1" Ht.
#1981845

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420MB IDE HARD DRIVE

3.5" x 1" ht.
#1920787

$169

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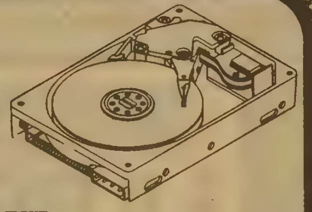

420MB IDE HARD DRIVE

3.5" x 1" Ht.
12 msec Access Time
256K Buffer
7420AV #1972979

$179

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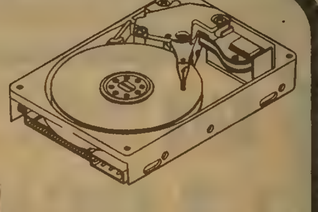

540MB IDE HARD DRIVE

3.5" X 1"HT. • 12msec Access
CFA540A
#1802210

$209

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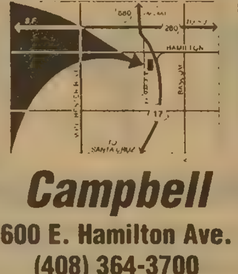
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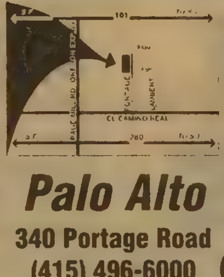
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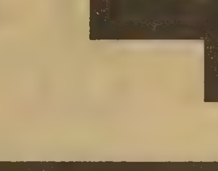
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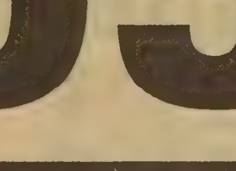
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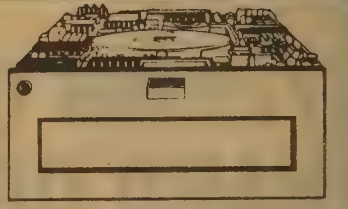

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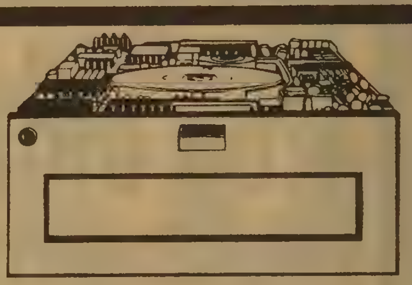

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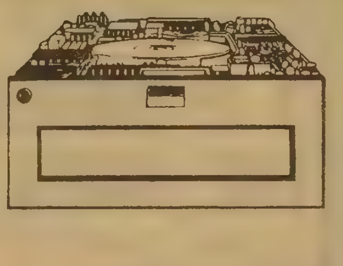

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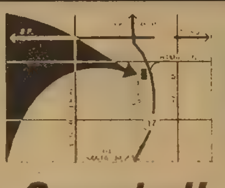

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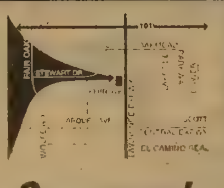

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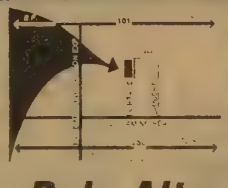

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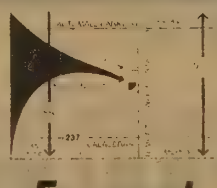

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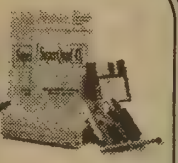

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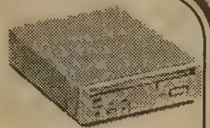

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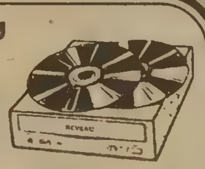

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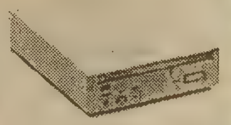

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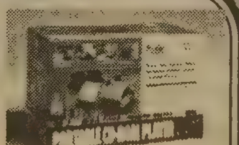

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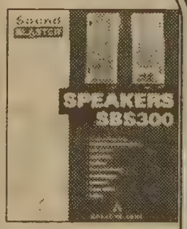

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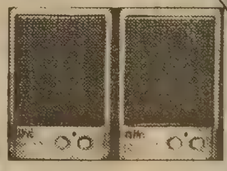

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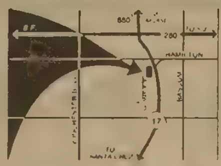

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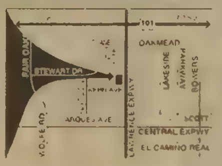

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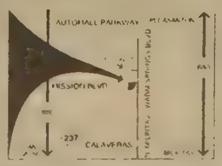

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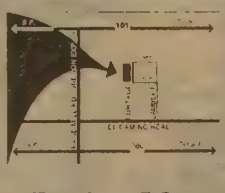

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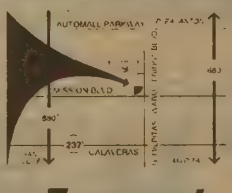

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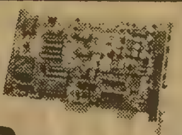

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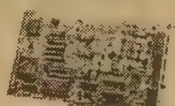

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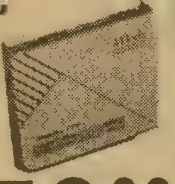

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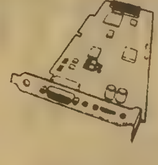

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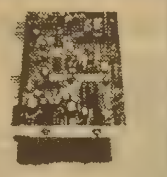

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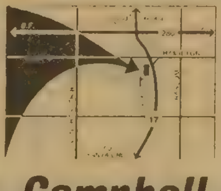

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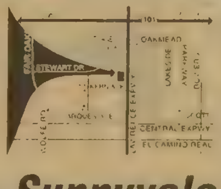

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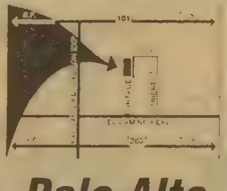

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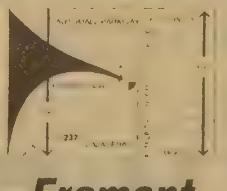

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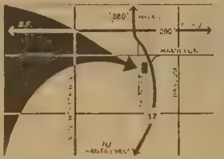

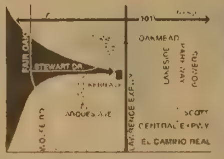

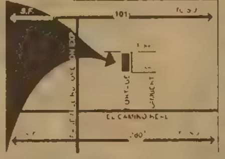

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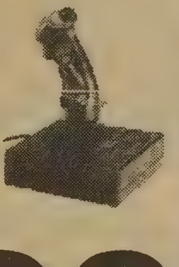

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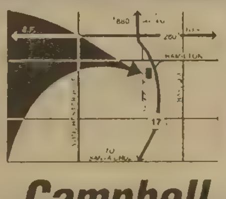
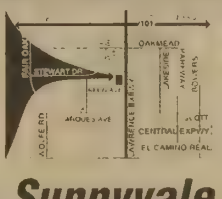

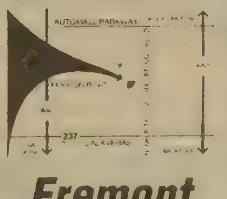

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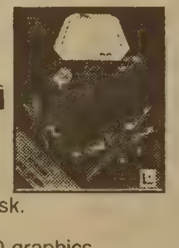

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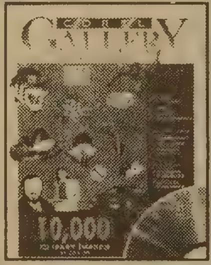

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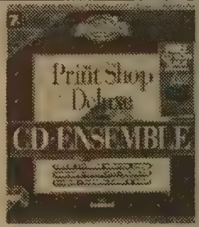

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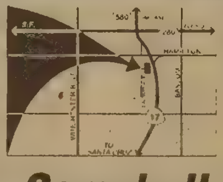

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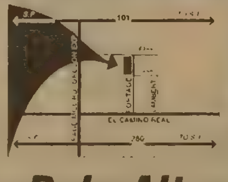

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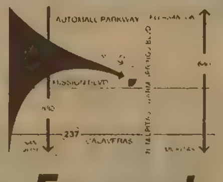

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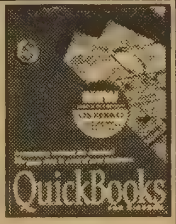

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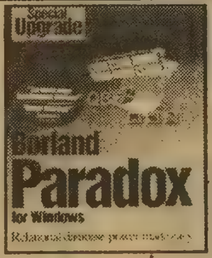

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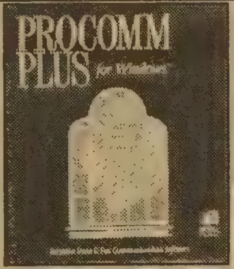

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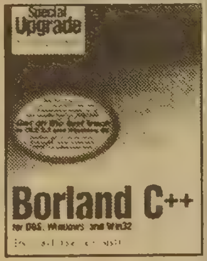

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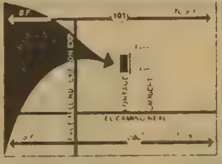

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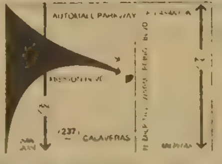

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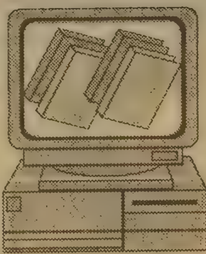

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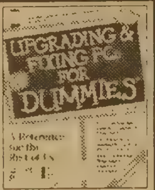

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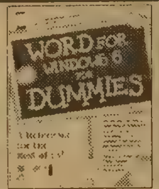

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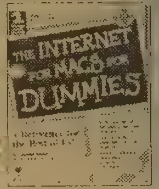

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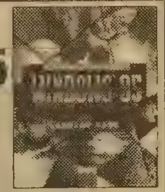

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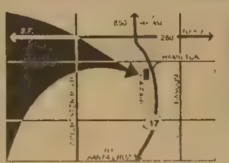

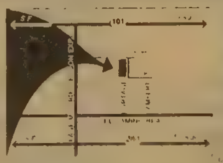

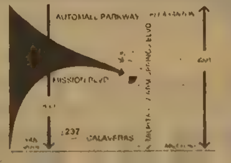

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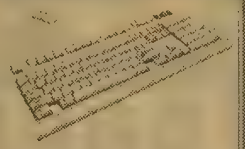

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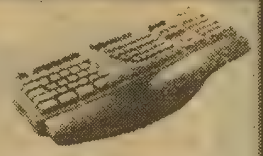

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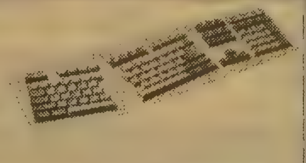

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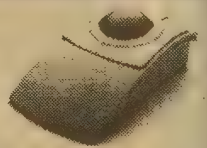

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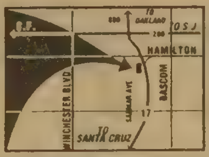
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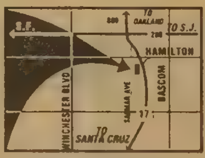
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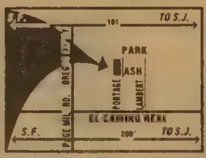
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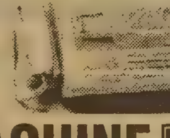

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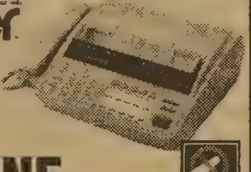

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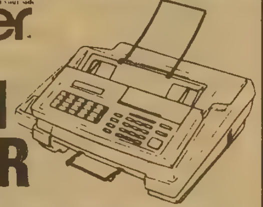

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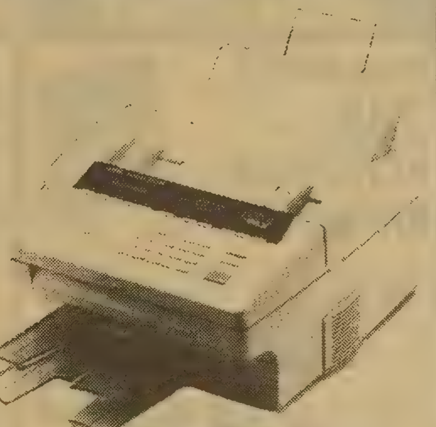

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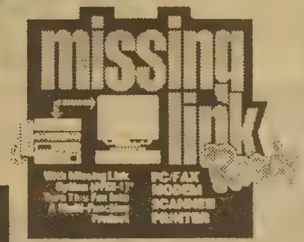

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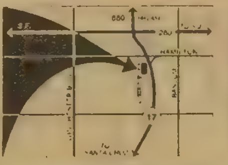

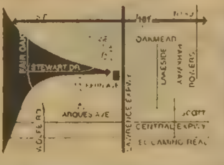

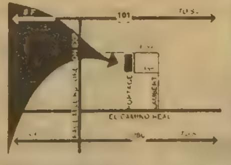

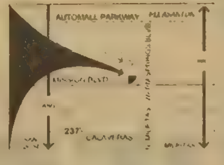

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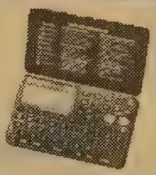

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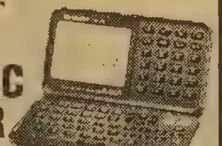

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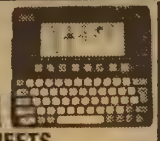

Psion has redefined the state of the art in hand held computers with the new Series 3. It may be small, but this pocket-sized programmable computer comes equippedwith features found in desktop machines plus powerful built-in software, including a full specification word processor and outliner that s compatible with Microsoft word. When using the Series 3 you will quickly learn from the system of graphic displays and option list how easy the Series 3 is to use. And with Psion's unique Multitasking Operating System, as many of the facilities as you want can be used at the same time! Other features include an automatic phone dialer, world information, a time and personal management file, powerful graphics programming language (OPL/w) which will enable you to write your own applications and two expansion ports for plug in SSD devices for unlimited memory and software.

$399

Model SERIES 3A
#1843567

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1MB PALMTOP COMPUTER
WITH 80x25 FULL SCREEN
MS-DOS 5.0 & BUILT-IN POCKET QUICKEN

The smallest, lightest HP PC ever comes equipped with complete organizer software to manage your time, tasks and data, plus you can retrieve information instantly with a full range of built-in personal productivity tools. The pull-down menus and dialogue boxes make it simple to master the familiar commands, and the high-resolution display with zoom option is easy to read ! With Lotus 1-2-3 built-in you will have full spreadsheet capability, including graphics and macros. Also includes CC:Mail built-in. Now only...

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Model HP-200LX
#1941670

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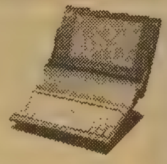
1.9 lbs. SUB-NOTEBOOK
RUNS ON 4 AA BATTERIES UP TO 10 HOURS



2MB RAM • 2MB ROM • 2 PC MCIA Type II Slots Fax/Modem Built-In • Serial/Parallel • 640 X 400 Resolution Preloaded Software: DR DOS • Bitfax LapLink XL • BitCom DataSel Gold • Contact Manager.
AA batteries not included
By OMRON.

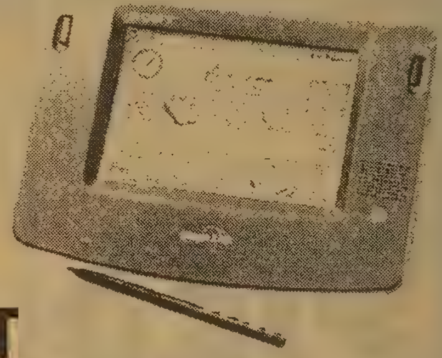
$599

Model TOUCAN
#1809653

PERSONAL COMMUNICATORS

SONY.

Magic Link



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A revolutionary concept in electronics which integrates the most useful features of personal computers, telephones and pagers in a handheld, portable unit. By incorporating Magic Cap™ communicating applications platform and Telescript™ technology, the Magic Link™Communicator represents a leap forward in the use of technology to enhance your lifestyle. Features include integrated Fax/Data Modem built-in mic/speaker, Pocket Quicken, PenCell Spreadsheet, Spell Finder, Datebook, Notebook, Calculator, File Cabinet, mind game software, and much more. Magic Link™ will also facilitate various modes of communication including Phone, E-mail, Fax, Pager and Infrared, as well as supporting AT&T PersonaLink℠ Services and America Online service.

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Model PIC-1000
#1959305

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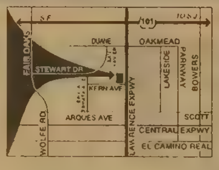

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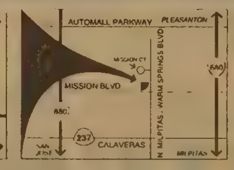

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ANSWERING MACHINE

Answering System with Auto-Logic Operation, Tone Remote Control, Digital Display, Message Memo Recording and remote turn on, Auto-Logic Operation automatically rewinds, plays messages, stops at the last message and resets itself at the touch of one button.

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Model KX-T1000
#1498194

Panasonic

DUAL MICRO CASSETTE ANSWERING SYSTEM

Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

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Model KX-T2100
#1740208

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DUAL MICRO CASSETTE ANSWERING SYSTEM
WITH VOICE TIME/DAY STAMP

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Model KX-T2300
#1740219

Panasonic

TWO LINE ANSWERING MACHINE
WITH VOICE TIME/DAY STAMP

Perfect for the home or office, this Panasonic two line answering machine offers voice time/day stamp, voice prompts, 2 variable greeting messages, room monitoring, message alert, call screening, auto interrupt, toll saver, and more. Now just...

$129.95

Model KX-T5300
#1768084

BUSINESS PHONES

Panasonic

SPEAKERPHONE

For the office or home, this phone has all the features you need. It has a speaker phone, 28 station automatic dialer, automatic redial and much more.

$49.95

Model KX-T2315
#1530100

Panasonic

TWO LINE SPEAKERPHONE

A perfect compliment to your home or office, this two-line speakerphone comes equipped with 3-way conferencing, 20 number programmability, seperate ring switches for each line, and a local mode function. Now only...

$69.95

Model KX-T3120
#1510676

Panasonic

2-LINE SPEAKERPHONE
WITH LCD DISPLAY

From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$89.95

Model KX-T3175
#1745122

Panasonic

THREE LINE SPEAKERPHONE
WITH LCD DISPLAY

From Panasonic comes this fully featured 3-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 48-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$169.95

Model KX-T3185
#1768039

10 CHANNEL CORDLESS PHONES

Panasonic

10 CHANNEL CORDLESS PHONE

Most cordless phones have a very short battery life, but this one can last up to 10 days in the standby mode! Add a flexible antenna, 10 number memory, 10 channels, paging and you have an excellent value at...

$69.99

Model KX-T3712BK
#1916654

Panasonic

10 CHANNEL CORDLESS PHONE
WITH QUICK CHARGE & SECURE GUARD SYSTEM

Panasonic has developed the latest in cordless technology by incorporating a Quick Charge system that will enable you to recharge its battery in one hour providing 7-day standby or 3 hours providing 21-day standby! The Secure guard system can help keep your conversations private and help prevent eavesdropping scanners or baby monitors. Other features include one paging, 10 number memory, last number redial, flash, auto security code settings and much more for only.

$118.95

Model KX-T3940
#1820915

Panasonic

10 CHANNEL AUTOSCAN CORDLESS DUAL KEYPAD SPEAKERPHONE
WITH SECURE GUARD VOICE SCRAMBLING

Panasonic's comes equipped with secure guard which scrambles your voice when others try to listen in on your conversations with other cordless phones, radios or even scanners! Other features include quick charge technology enabling to fully charge the battery in only 3 hours for 21 day standby, 2-way paging, intercom, 10 number memory, high gain antenna, and much more All for only...

$159.95

Model
KX-T3965
#1886160

Panasonic

10 CHANNEL CORDLESS SPEAKERPHONE
WITH DUAL MICROCASSETTE

This top of the line cordless dual microcassette answering system with sound charger technology delivers sound so clear, you will hardly believe your ears! Some of the features included are: 2-way paging, intercom, auto security system, message alert, 2-way and memo recording juct to name a few. Now only..

$199.95

Model KX-T4400
#1802450

FAX MACHINES

Panasonic

FAX MACHINE
WITH PAPER CUTTER, SPEAKERPHONE AND ALL DIGITAL ANSWERING MACHINE

Panasonic line of fully featured fax machines start with this compact model which includes 64 level grayscale, super thermal paper compatible, paper curl reduction, 164' paper roll capacity, 15 page document feeder, distinctive ring, delayed transmission, paper save mode, telephone directory with alpha-search, 12 station one-touch with 28 station speed dialing, and much more. All for just...

$349

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KX-F750
#1944282

Panasonic

PLAIN PAPER FAX MACHINE
WITH 20 PAGE MEMORY

The ultimate plain paper fax from Panasonic features a jumbo LCD display, 70 page paper cassette, adjustable letter/legal tray, 32 level halftones, polling, activity reporting, 20 page document feeder, broadcasting to 128 locations, fax transfer, enlargement and reduction copier functions, fax/tel switch, 28-station one-touch dialer, 100-station speed dialer, telephone directory with alpha-search, and much more! Now just.....

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Model
KX-F3000
#1850626

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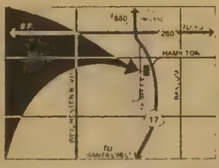

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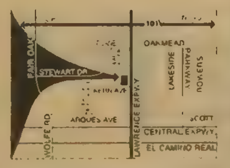

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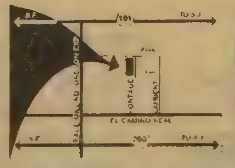

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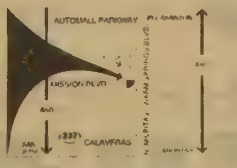

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BELL Phones
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SPEAKERPHONE
WITH 13 NUMBER MEMORY

The convenience of a handsfree speakerphone allows you to do other tasks while having a conversation on the phone. Features include 13 number memory, auto redial, mute, flash, and more. An excellent addition to any home or office at only...

$19 99

Model 4350
#1917518

SONY.

SPEAKERPHONE
WITH 32 NUMBER MEMORY

From the leader in cordless phone technology comes a new line of feature phones. This unit has a crystal clear speakerphone, 32 number memory and more!

$49 95

Model IT-D100
#1516878

Panasonic

LCD READOUT SPEAKERPHONE

This outstanding value from Panasonic offers a 12-digit LCD readout for phone number, clock, call timer(minutes & seconds), and operating modes. Perfect for the home or office at only...

$69 95

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TWO LINE FEATURE PHONE
WITH SPEAKERPHONE

Phones with 2-line operation are relatively common, but this phone offers a distinctive ring for each line! The LCD indicator will tell you the number dialed and the time. Now only..

$79 95

Model IT-D250
#1516904

MULTI-LINE PHONES

BELL Phones
BY NORTHWESTERN BELL PHONES
A U S WEST COMPANY

TWO LINE PHONE

Perfect for the home office with multi-line needs, this 2-line phone from Northwestern Bell features line-in-use LEDs, 3-way conferencing, 15 number memory, hold, flash, pause, and ringer controls. An excellent value at...

$39 99

Model Easy Touch 2202
#1890905

Panasonic

TWO LINE PHONE

A two line phone doesn't have to cost a fortune. Panasonic has the low cost answer for you. This unit has a convenient auto dialer, conference calling and much more!

$69 95

Model KX-T3110
#1505313

Panasonic

TWO LINE SPEAKERPHONE
WITH LCD DISPLAY

From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$89 95

Model KX-T3175
#1745122

AT&T

THREE LINE SPEAKERPHONE

AT&T's multi-functional centrex compatible 3-line speaker -phone comes equipped with page, intercom, 3-way conference, LCD display, 40 number memory, auto line selection, hold, do not disturb function, auto-redial, mute, programmable pause, call transfer, flash, seperate ringer controls, and more, all for only.....

$179 95

Model 843
#1853892

ALL DIGITAL ANSWERING MACHINES

AT&T

ALL DIGITAL ANSWERING MACHINE

This AT&T answering system utilizes tapeless digital technology to ensure consistent recording quality over the life of the system. The convenience of new message playback, outgoing message bypass, remote system turn on or off and remote message recording makes this an excellent value at only...

$59 95

Model 1710
#1853906

BELL Phones
BY NORTHWESTERN BELL PHONES

ALL DIGITAL ANSWERING MACHINE
WITH TIME DAY STAMP & 13 MINUTE CAPACITY

This fully featured all digital answering machine from Northwestern Bell comes equipped with Time/Day Stamp, Programmable Security, Selective Skip or Erase, Call Screen, Extension Pickup, Auto Disconnect, Multiple Memo Record, Toll Saver, VOX, 13-Minute Capacity, Remote Access, and much more! An incredible value at just...

$49 99

Model 700
#1964820

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GE We bring good things to life

ALL DIGITAL ANSWERING MACHINE
WITH THREE MAIL BOXES

With three mailboxes to choose from, members of the household can have messages stored for them in their own mailbox! The all digital capability eliminates the need for moving parts and allows for instant playback of incoming messages-no need to wait for a tape to rewind or fast forward! Other features include voice time/day stamp, two outgoing messages, digital counter, selective message erase and much more for only...

$79 95

Model
2-9876
#1839261

AT&T

10 CHANNEL CORDLESS SPEAKERPHONE
WITH 26 MINUTE CAPACITY & ALL DIGITAL ANSWERING MACHINE

From AT&T the leaders in telecommunication technology comes this state-of-the-art 10 channel cordless speakerphone with 26 minute capacity All Digital Answering Machine. With features that include 2-Way Page and Intercom, Hold, Last Number Redial, Time/Day Stamp, Multiple Outgoing Announcements, Voice Prompts, Digital LED Message Display, Call Intercept, Call Screening, and much more, AT&T has developed an invaluable addition to any home or office for jus

$219 95

Model 5650 #1919543

900 MHz CORDLESS PHONES

uniden

40 CHANNEL 900MHz CORDLESS PHONE

Uniden's latest 900MHz cordless phone gives you unparalleled range and performance along with premium features that include 40 channel selection, call monitor, 2-way/hands-free intercom, 10 number memory, mute, last number redial, flash, and much more, all for just....

$189 95

Model EXP-901
#1965005

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100 CHANNEL AUTO SCAN 900 MHz CORDLESS PHONE

By combining 100 channel auto scan (which allows the phone to lock-on-to the channel that is getting the clearest signal) and 900 MHz crystal clear technology (for improved clarity and extended range), GE has developed the ultimate cordless phone! Other features include 10 number memory, page/find from base to handset, handset volume control, distinctive ring, and more. An excellent value at....

$189 95

Model 2-9910
#1923425

AT&T

DIGITAL 900MHz DUAL KEYPAD CORDLESS SPEAKERPHONE

AT&T, the leader in digital telephone technology once again leads the way into the future with the introduction of this 900MHz cordless phone. By operating at the 900 MHz frequency range rather than the conventional 46 to 49 MHz range, this AT&T cordless phone will provide clearer transmission with less noise and interference from other electronic devices, as well as extended range performance! Features include 10 number memory, mute, hold, flash, last number redial, one-way paging, out-of-range-indicator, digital voice encryption, and much more for only...

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Model 9120
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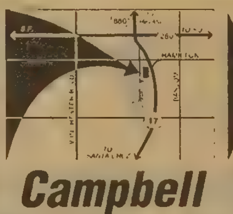

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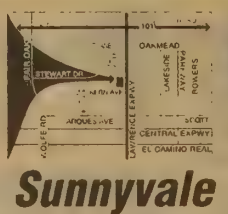

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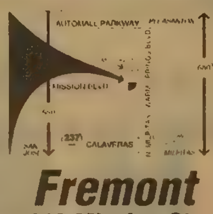

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DIRECTV

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5 HBO CHANNELS
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3 CINEMAX CHANNELS AND MORE

RCA

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Enjoy over 150 channels of top-notch entertainment with the crystal, digital clarity of the new RCA DSS system. CD quality sound and over 400 lines of video resolution, provide an incredible entertainment experience. Let Fry's and RCA help you drive on the Information Superhighway!!!

LIMITED QUANTITIES

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MODEL DS-1120WR
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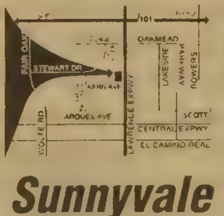
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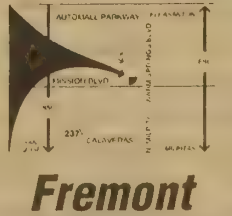
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continued from page 140

and may the best man win."

At that point you start worrying about de facto standards, once you've figured out what gets paid for, what's the best fit to that.

There are a number of other real uncertainties as to how stuff that comes down a broadband pipe gets marketed. We don't believe in the vision that says it's all going to come over your settop.

Why?

There's a distinction you can make between what I'd call lean-forward and lean-back audiences for this kind of stuff. The venue of the living room is the lean-back: I'm home, I'm tired, I want to be entertained.

It's essentially passive.

It's essentially passive, right. And you've got a number of other factors.

The way that the television works is not well suited for input. The social environment there is not well suited. Are you going to compose personal email on that screen with the kids sitting around and watching it? Are you going to chat with your sister?

On a 40-column screen....

Exactly. So it's just not well suited.

There's no technical reason why that kind of functionality can't partition onto the PCs, which I call the lean-forward, the engaged market. For people that want to decide what information they want to get on demand, for people that want to talk to other users privately, there's already a device of choice for doing that. There's no reason you can't have a cable modem snaked out one side of your broadband feed, just as you'd have the settop coming out the other side.

There's also some financial subtleties in this, in that the cable companies, under the current convention, basically buy those settop units, the ones you need to get movies, and capitalize them and put them on their balance sheets, and then they rent them out to you. That means they're taking a balance-sheet risk every time they do that—they're making a bet that they can get their money back out of that device because you're going to use more services over a period of time.

That's one of the reasons that everybody in the industry knows, for instance, that the Orlando settop device and the ones being used out in Castro Valley are not practical. They're very, very much too expensive. The cable companies understandably are resistant to pushing up the costs they pay for one of those devices much beyond the $100, or for the most extravagant, $200 price point.

Particularly since their customers are screaming about the rates anyway.

Exactly. The last thing they want to do is have to push up that basic bill, which produces a lot of push-back.

They're also faced with the problem that they don't know the actual rate of return on doing things like video-on-demand, interactive home shopping, and so on. So they're, to some extent, between a rock and a hard place, and have the possibility that, given the rapid advance of technology, they could make a bet on somewhere around a hundred thousand $200 devices and find out they're not getting their money back.

Now, look at it from my point of view, coming in from the PC. I have the very nice position where my customers go down to CompUSA and essentially buy my delivery devices for me, because they get a lot of other uses out of it as well. They could do their checkbook, they could fiddle with graphics, they could play games, they could do anything they darn well please. I haven't got that problem. I don't have to capitalize that device.

And that device gets more capable year by year on an exponential scale. Thank heavens for the Valley and competition.

God bless Gordon Moore!

[*laughs*] Yes! The law still works! Those curves keep on a-running.

We've now got a very clear proof that the market will not only bear that acceleration of demand, but in fact they'll re-buy in order to get more capability periodically.

Basically the old iron stacked up is getting replaced. That's one of the things that we've seen in the last couple of years, is that the people who bought in early will re-buy if they see a possibility of getting something new.

Contrast that to the situation of the cable operator that maybe put that stuff on his balance sheet as seven-year property. Now it's two generations along and it looks pretty silly compared to the competition. That's one of their risks, that in a rapidly evolving technology market, that churn that makes the money for the PC companies hurts the cable company.

So we think it's going to partition out very early, that people who want the high-interactivity stuff will tend to gravitate onto the PC because they're there already. And if you look at the relative growth curve of broadband installation versus PC adoption, I don't see exactly how you can make those cross. The PC is going to be there first.

Now, there may be some fusion media, and to me this is one of the most intriguing things about what we're going through right now. We, for instance, have a joint venture going on with CNN, where they have a program called *Talk Back Live.*

They try to get not only live interaction with the audience, but also live and canned-up reaction via fax and via email. We support a forum for that. People are told in advance who the speakers are going to be, and what some of the issues are, and they can send things in, and they can also do it live.

I don't usually have enough time to sit around and watch this thing, but I ended up at home sick a few weeks ago, and actually flipped it on while Newt Gingrich was on, which was one of the more lively shows. When I went and checked the forum, yes indeed, there was probably more traffic in that particular topic than most of the others.

So one of the possibilities that may be coming out here is that you end up with a hybrid medium that nobody really thought about in advance. You've got TV being good at what it's good at—basically packaging things and broadcasting them out. There you've got the MC, you've got the guest of honor, you've got sort of the commons of the program being blasted out there. The back channel is going through a medium like us, through a computer.

One of the possibilities is all this interactive TV is in fact two things, side by side. TV coming down one pipe, the interaction happening on another one.

Then you've got the possibility, as the technology advances and once we've worked out the rights issues, of being able to say, "Here's where Newt gave that really controversial answer. Let's just put that up online."

Now, is that video on demand? Maybe it's clips on demand. It's the logical extension of doing things like downloading and searching for news stories. And then you can react to that. That's one of the interesting possibilities, that this broadcast channel may become a springboard for interactive discussion.

Very shortly thereafter Gingrich was giving his speech about how they were going to put this THOMAS system up, to expose in public all the bills going into the hopper and all the interactions. So now you've got the possibility that you might have C-SPAN, which won't go away, showing you the public proceedings, and you've got the back channel going through the computing medium. From a point of view of somebody that likes to step back from the industry occasionally and think about where it's all going as far as a medium, this is one of the most intriguing possibilities, that TV used at its best may be complementary to online used at its best. If you try to combine the two, you get a train wreck, if you try to drive them down the same channel and with the same business structure.

So they kind of evolve in parallel.

That's one of the possibilities.

What are some of the others?

The ghost of ISDN gets up and walks. I'm not saying that's a for-sure, but you may be getting into a situation where there's a sufficient demand driver. It might be called the Internet and online.

Twenty-eight point eight is virtually upon us; we've got 28.8 dial-in modems in the lab, shortly to deploy, and we are very close to hitting the wall in

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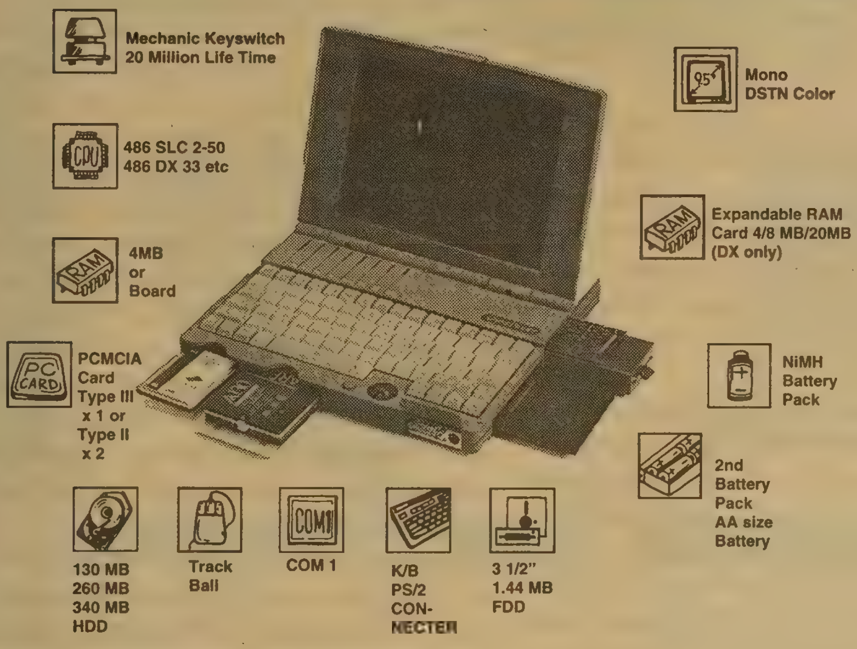
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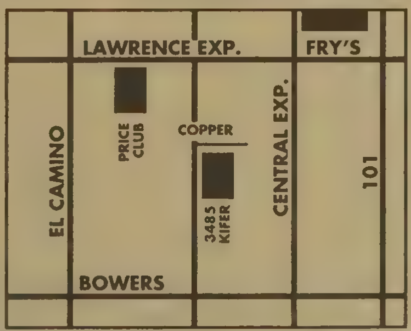
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terms of what you can do with an analog twisted pair. We're finding out, depending on the characteristics of the local loops and switches and so on, that not everybody is actually going to get benefit out of that 28.8.

So boom!, we hit the wall. And at the same time we've got everybody out there making Web pages and making enhanced menus on CompuServe... There's enough interest out there, enough material being produced, both on the commercial services and at the amateur level, that people are going to say, "All right, what's next? I can't wait for the multi-billion-dollar investment to be made to get broadband, true fiber coax broadband."

So there is the possibility that there's a need to be filled. Now the question is, Who will step forward to make ISDN really transparent? It's a usability problem—can you get it to where it's at least as simple or simpler to install than a conventional modem? That's the real problem. It's really a matter of your amateur user knowing how to plug it in and use it.

Right now even network specialists still have trouble.

Well, yes. Having lost a darn good engineer down that hole for a couple of weeks once, it's not a task for the faint of heart at this point, including for companies that know a good deal about networking.

So to me that's the big question—can somebody make it usable in time to catch the possible wave of interest that can come out of things like the Internet in its more intensely graphic component? Is there a window of opportunity then before the true hybrid broadband pops in?

Because if nobody steps forward and makes it usable, we'll all just go to 28.8 and sit around and wait, unless people have wired connections or dedicated 56es or T1s.

One possible piece of optimism at this point is that if you're a modem manufacturer, exactly where do you have to run? The 28.8 stuff came out so fast it discoordinated, because they had to run from 14.4 because there's no margins left. By this time next year there won't be any margins at 28.8, so what exactly *do* you do if you're a modem manufacturer?

They have an incentive of saying, "Let's go at least give this ISDN a try, and try and simplify that." One of the problems being that it's not just a plug-it-into-the-wall and plug-it-into-your-PC thing any more; you've got to fool around with the actual home telephony wiring. That's an interesting little problem, since the phone companies have more or less thrown up their hands in terms of the internal wiring—it's a for-pay job, and not a cheap one either.

That is the basic hurdle—not the technology, it's getting the installation down.

What impact is the boom in home computing having on the online world? Your historic strength on CompuServe, for instance, has been in the technical forums.

We're trying to broaden out now, to people that are more in the midrange, people that are going to use the thing as a means to an end.

On the computer side, that was the kind of thing you started seeing when desktop publishing took off. Where people were basically saying, "Oh, I could use this, and I could replace a very expensive phototypesetting setup and get my work done. I don't particularly care how many megabytes, except that it always seems to want more, but I can get my work done."

Then you started getting that category online to some extent, people that didn't necessarily want to talk about the ins and outs of UNIX, but instead they want to talk about the latest hacks on Photoshop. Or they want to trade stocks, or they want to get research information on particular companies, that type of stuff. That crowd to some extent has come on, and we've done okay on those. So have some of our competitors.

Now you're starting to get into the tier that basically don't know and don't want to know about the technology. They're in it for fun, in many cases, or to achieve a very focused end. This is the class of people that run game machines, right? They don't particularly care what's in that box, except it seems they always have to keep buying a new one to get the latest stuff, but mostly what they want is entertainment. Or people that punch an ATM—they've got no idea what's behind there, all this huge worldwide network with crazy technology inside it—I punch things in, money comes out, I get a statement.

That's the kind of people that are now beginning to buy PCs. Because they now come widely available with modems and bundled-in software from companies like ours, they're coming online too. That's going to force a simplification of the services. It already is, in the case of some of our offerings and some of our competitors' offerings. People can find in one place stuff that more or less addresses a particular end. Whether they're interested in the movies, for instance, or they want to chat with other people, find it all in one place and just get that done.

And the Internet will evolve in that direction, too, inevitably. We're just now moving out from the people that are basically the gearheads, the early adopters that would put up with the UNIX command lines and the occasional crash and having to know what a DNS is or having to type in an IP address by hand occasionally.

The Web is one of the things that's really changed that. People can now go out there, put up something, however inexpertly—it looks an awful lot like the early days of desktop publishing all over again—but they can put their stuff up, and other people can see it, and interesting things are beginning to happen. So the Internet's now beginning to move through that same pattern.

You can look out into the future and say that at some point out there you will have the people that don't know and don't even *want* to know about what the Internet is that are going to be using it. By then probably the hype will have died down and it will be called something else, but they'll be on the Internet. They'll be using it for a very particular purpose—to entertain themselves, to communicate with other people, and they'll use it in a very focused way, much as you use an ATM right now.

What we're already seeing, and I'm sure PC manufacturers are seeing the same thing, is that there's a younger group of people moving up and beginning to buy machines, go online, that grew up with game machines. They never knew a world without Pong. Or even Mario for that matter.

From the point of view of somebody wanting to do one of these widespread well-accepted services—the advantage is that those people are fearless. They're used to, from childhood, picking this stuff up, and if I can't figure out what to do with it, well, I'll just bang on it. And eventually I'll figure out that secret code that lets me get so many more levels, or whatever.

But I can't break it.

As long as you can figure out how to meet that set of expectations, to some extent you can count on people that aren't scared of the technology that will barge around (that's an [Apple Fellow] Alan Kay-ism) and find things, and will be a lot less worried about the fact that they're dealing with technology. Any more than people of your or my age worry about the fact that if we pick up a touchtone phone or go out and go to a stoplight, that we're dealing with technology. In fact, we're dealing with very complex switching systems in both of those cases and we don't even think about it.

There's a whole set of people now that deal with very complex technologies of an interactive sort and don't even think twice about it. It's always been there.

And also I should give fair credit to people who are maybe a little further up in years. People will put up with a fair amount of manipulation if it lets them get something done, if they can see they're making progress. But you can't get a system bomb up there too often, or a GPF over in your Windows system. You really do have to make it bulletproof, because they're not very forgiving.

There probably still exists a tape in the archives at Apple of a fifth-grader reading Bill Atkinson the riot act about what was wrong with HyperTalk, and doing a very cogent analysis of the whole thing.

That's when you want to get them if you're critiquing a project—they're old enough to have an opinion and too young to be socialized against telling you what it is. One of the advantages I've

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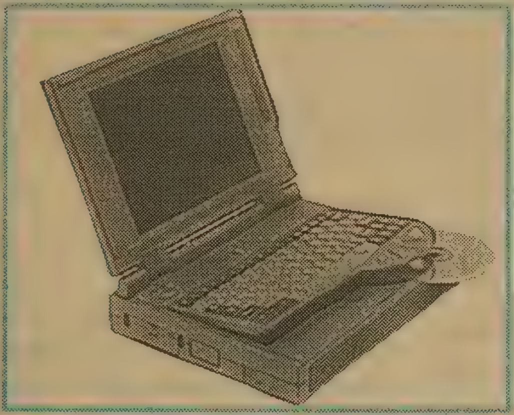

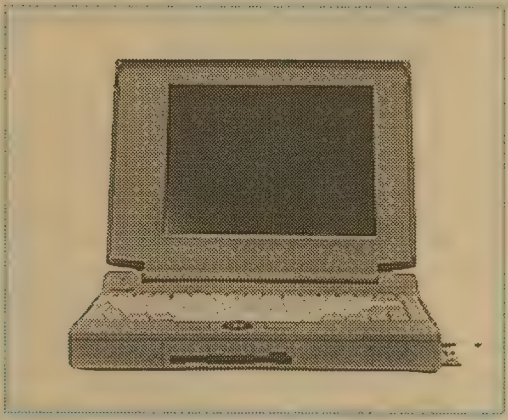

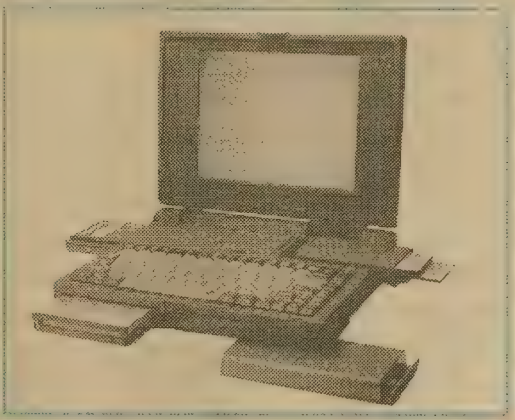

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got, being an old research guy now moved into the online business, is that if I want to try something out, I've got two million people out there, some portion of which will try it out and tell me real quickly if I have a winner on my hands or if I've got a problem. Instant test-tube. No need to guess, no need to run the focus groups—if you can turn it on, just turn it on and go.

Just post the disclaimers. [*laughs*]

I've got a group in Massachusetts that's deploying some machine translation of natural language on the service. It's licensed technology, nothing exotic—translation from English to German and back, and English to French and back. Like most such technologies you wouldn't want to trust it with a legal document.

What we're trying that's new is using it in a social context, where people are wanting to talk to each other about various things, and if it doesn't quite work, somebody can say, "Huh? Can you say that again?" or somebody else will jump in and say, "I think they meant..." Right now that looks like a limited success, and we're going to try doing it on a larger scale, the basic reason being that people like to talk to each other, type to each other, that's where we make our money.

The more transparent we can make it, the more cultures we can bridge together that would like to talk to each other, the wider the community grows. From the wallet-hugging part of my personality, that works well; from the part of me that's in this because I really want people to have a worldwide community, that looks good too.

We'll see what happens. We're already seeing a few phenomena out there—although we put this up originally on a support forum, on the idea that at least it was something we know that was being talked about, topic drift is inevitable. So people were out there talking politics, talking about the weather, sending messages to themselves—they can get a free translation—and what's been most instructive is those failures, how people are trying to bend it all. So we're watching and learning from that.

You can't anticipate every scenario that's going to happen and everything that's going to go wrong and every way that somebody's going to think of to do something.

Right. With two million potential users out there, there's for certain going to be a lot of people thinking of things you don't. And the best thing you can do in some cases is to put it out there, and watch for how they try and bend it.

We've got a few other things coming down the pipe that we'll try that with as well—put it out there on a limited scale and see what people make out of it all. What's the worst thing that could happen? Take it back down and confess it didn't work—and that's better than having to spend a large amount of money polishing it perfectly and deploying it large-scale and finding out, Oops, no demand, no interest.

> **I think one of the generic mistakes that's been made with things like home banking is that the urge to transact is not that far up there in terms of end-users' and consumers' priority of needs.**

From where we are now, what do you think would be the next coolest thing to have to enhance the whole online experience? This is speculative, not an invitation to preannounce products you're not allowed to talk about!

I think one of the most interesting potentials that a number of people are working on goes back to this whole idea of agents, but I mean it in a somewhat different way from, say, General Magic. I worked on the agents problem over at Apple, as have a large number of other people.

One of the things you start seeing on the nets is that a large amount of information focusing and dissemination happens in a person-to-person style. When you get saturated even by the mailing lists, when you start dropping off of them because even ten messages a day is too much traffic, and the digests are too long to read, what you fall back on then is a sort of social credit scheme, where people will send you interesting forwards, and you value them according to who did the final forward to you and how many others there are on there. There's an expectation in return that you're going to forward back neat stuff, right? You're part of a little community there. So you're my agent and I'm yours.

So there may be an interesting kind of person-machine hybrid out there, as it were, that includes the stuff you can automate, the sort of very rough textual analysis and focusing, which we all know is fallible but is better than having to do it all by hand, combined with an ability to basically give credit where credit is due, in terms of somebody that endorses a message.

The Xanadu scheme?

To some extent. A number of Ted Nelson's visions are coming true, just not exactly in the way that he originally intended, and in a very disorganized, decentralized fashion.

So there may be some interesting hybrids. To me, one of the most interesting things to "retrieve" is not necessarily a database or a chunk of a database, it's a person. Somebody that I can talk to in a very interactive way and find out an answer to what I actually wanted to find out, instead of having to do my own analysis. If you're in business, who cares if I have to pay them a thousand bucks, I'd have spent that much on Dialog by the time I was done anyway, and certainly that much of my time.

Editors are going to do great in this new world, because somebody needs to make sense of all this.

Professional filters.

Yes, the professional filters are going to do just fine. The analysts. When I finally find out who's the person that has reasoned this through before, that can lead me down the path in an efficient fashion—if there's a system that exists to make it easy to find that person, they're going to do great too. They'll be able to get their value out there without basically needing to join up with an EDS or something like that. They can get their value out in a way in which the transaction costs have been dropped rather radically.

People like yourself, editors, people with a byline, writers, should at this point believe they're in the catbird seat. You're in an excellent position. Because attitude, point of view, knowledge, and analysis are going to be upvalued by all of this. And there are going to be fewer toll-takers standing between people like you and your end-users. It's great news for people on the creative side.

There's an idea that textual literacy is a dying thing, that video is taking over, the new generation ain't what we used to be. That may be true in terms of entertainment forms to some extent. People may have a little more appetite for a video now than a good long read.

But I think we're seeing potentially the rebirth of letter-writing. We're doing it in screens-full rather than pages-full. It's no longer what will fit in a 32-cent envelope, it's what will somebody read in terms of paging down. The art of cogent argument and keeping alive an argument in a small space is

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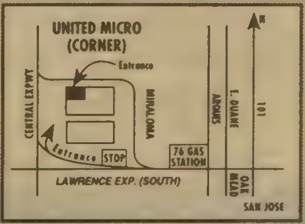

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There's a new value, if you look at places like The WELL, like our forums, like Usenet, of people that can find the crucial piece of information, synopsize the argument, crystallize the issue at hand—those people are highly valued at this point.

That to me will be one of the neatest things—as we kind of muddle through hybridizing the automatic technologies with the stuff that really puts people back in the system, puts people back in the feedback loop. That'll be pretty interesting, particularly as you try to span it across cultures and languages.

The Internet, to some extent, is the big Petri dish of that, the clash of cultures. Anybody that has ever followed *soc.culture.whatever* has seen them in action, because that's where people bring their old wars, their old hatreds, onto the nets.

And their old obsessions with really silly things.

Yeah, and in some cases don't realize how silly they're looking. The culture of the Net—and thank heavens, for the most part—is a more tolerant culture. You can't punch the guy in the nose, you can either ignore him or flame him. But the worst you can do is burn up some bandwidth. It's certainly better than shooting each other.

Why I like being in this business—to me if you've grown up twenty years from now, since being a kid, with having pervasive person-to-person worldwide communication, it's going to be a lot harder to shoot the other person.

I hope it's true.

And it's going to start "from the top down." It's always going to be the cognoscenti, the people at the top of that pyramid in any particular culture that get their hands on it first. Some of them are going to have trouble with it—it was just a couple of months ago that the first live node in Kuwait went up. There are some cultures that may have a little trouble coping with Net culture.

Singapore's going to have a real problem.

Well, Singapore's been live for some time. I don't know exactly how they're dealing with that, but I have regular correspondences with my friends down there. It's a research hub.

But again, you're dealing with that peak of the pyramid. The sophisticates. The people in the research labs, in industry, and so on. It's if it starts getting pervasive, moving out into the culture, to where they get the latter-day equivalent of a cheap Mac or a Sega machine and it comes with a CompuServe client or whatever we look like at that point built into it—that's when life is going to get kind of interesting.

If you want a precedent for what may occur culturally, just take a look at what Rupert Murdoch is running into as he attempts to take satellite TV into the Third World—a lot of resistance. There's a lot of people out there that took a lesson from part of how the Soviet Union fell, that you could almost look at communication as being a sort of solvent poured upon regimes of that sort.

"We like our culture the way it is, thank you."

Thank you very much. In other words, we like the culture with us running it, is the interpretation you could take in some cases.

So there's a lot of change ahead. But you could also see that putting up the barriers to it is probably the best way of ensuring you're going to be noncompetitive in the next century, that if you try to make an island of yourself and don't participate—

You'll be Albania.

An information Albania, yes. Having that pervasive in your citizenry, to where they're all enabled to communicate in that fashion, is going to be the only way to really get into the global economy and participate with scale.

So if you try to draw a line around—pick your favorite example—Burma, and say we're not going to plug in, fifty years from now you're going to be in sad shape. What you will find is that the people that have that ability are going to leave, and that societies like ours will benefit from it. You'll end up having, to coin a term, information refugees, that realize that the only way they're ever going to realize their potential is to get out of that circumstance and into a place where they can really play.

And there's a whole nother question that will face me, because stacked up behind French and German and Spanish is, of course, moving into Chinese, Japanese, and all the Eastern Eurpoean languages. It's an opening market.

Is Arabic an opening market at this point?

Doesn't seem to be at this point, but Hindi could get very interesting. It's a very easy leading indicator—are PCs becoming pervasive? There's your market. Because they'll lead, we follow. ■

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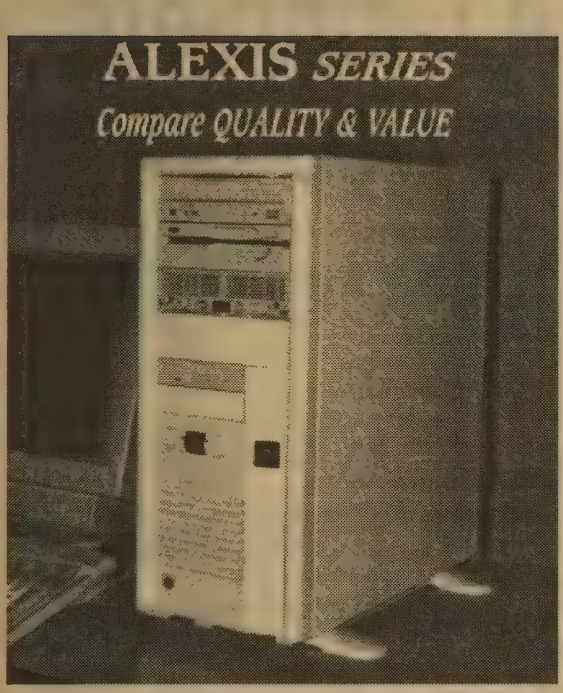
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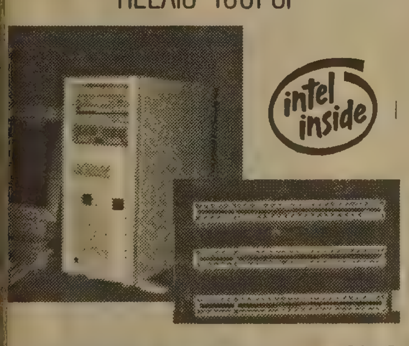

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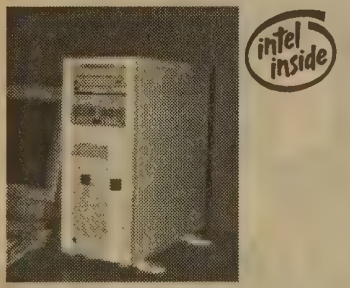

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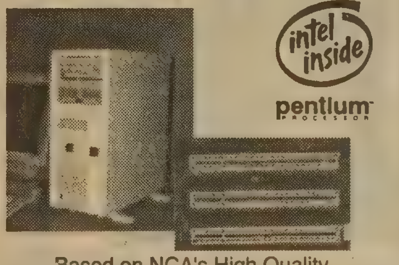

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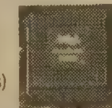

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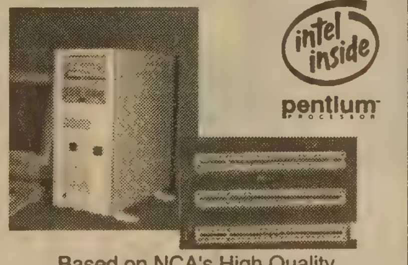

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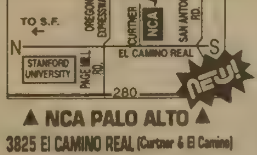
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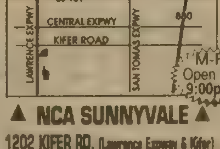
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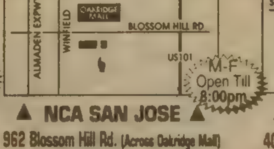
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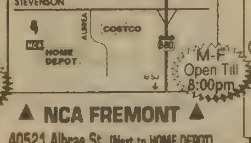
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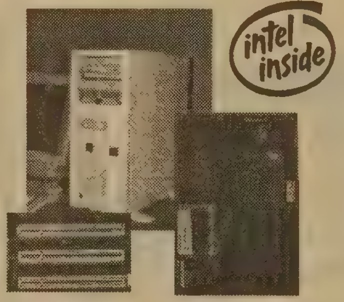
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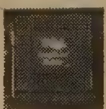

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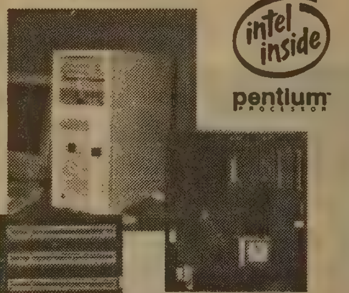
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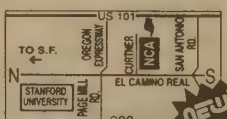
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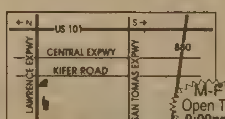
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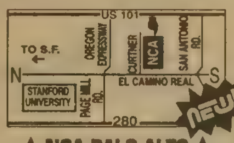
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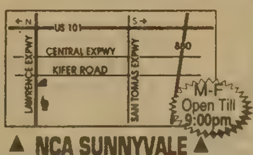
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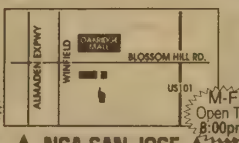
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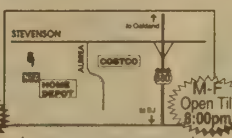
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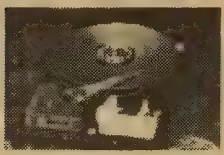
HIGH QUALITY BRAND DRIVES

WESTERN DIGITAL

540MB IDE 3.5"X1"

HARD DRIVE

- WD2540
- 12MS
- 3.5"X1"
- 3 YR. WARR.



$\$235^{95}$

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- AC2850
- 10MS
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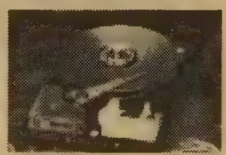
- 3 YR. WARR.

ENHANCED IDE



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WESTERN DIGITAL

1.0GB IDE 3.5"X1"

HARD DRIVE

- WD31000A
- 10MS
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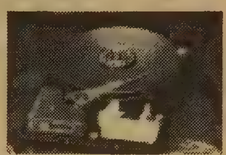

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- ST3780A
- FAST
- 256K CACHE

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Seagate

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HARD DRIVE

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- 256K CACHE
- 9MS
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EXTERNAL FOR PC OR MAC...$\$1012^{95}$

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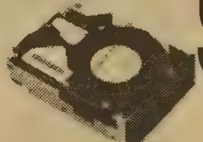
4.0GB IDE 3.5"

HARD DRIVE

- MC3243S
- 8.5MS
- 5400RPM
- 5 YR. WARR.



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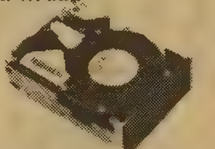
MICROPOLIS

1.7GB IDE 3.5"

HARD DRIVE

- MC2217A
- 10MS
- 5400RPM
- 5 YR. WARR.



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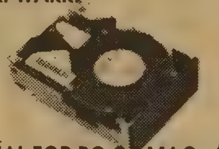
- 5400RPM
- 5 YR. WARR.



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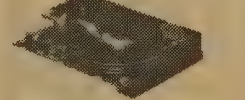
- 10.5MS
- 5400RPM
- 3 YR. WARR.



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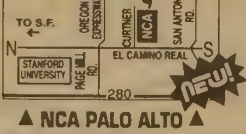
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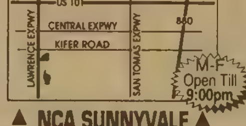
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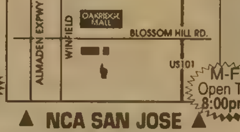
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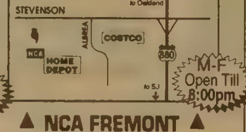
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- INCLUDES 1 CARTRIDGE & NOVABACK SOFTWARE

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- USES 2120 TAPES
- RUNS OFF FLOPPY PORT

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IDEAL FOR NOTEBOOKS, LAPTOPS 7 DESKTOP COMPUTERS!

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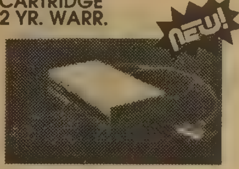
- WINDOWS & DOS BACKUP SOFTWARE
- INCLUDES QIC 3000XL CARTRIDGE
- 2 YR. WARR.



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- USES DC2120 TAPES
- 100% QIC COMPATIBLE
- INCLUDES WINDOWS SOFTWARE

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- ADAPTEC 16-BIT SCSI CONTROLLER CARD
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- UP TO 30MB/MIN. TRANSFER RATE
- ONE DATA CARTRIDGE

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JT-25

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PT-25

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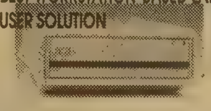

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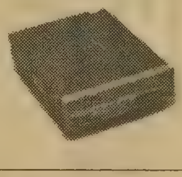
- 105MB INTERNAL DRIVE
- 13.5ms SEEK TIME



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- 13.2MBITS/SEC. TRANSFER RATE
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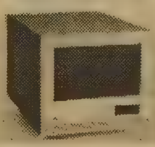

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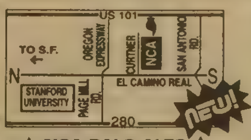
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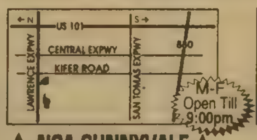
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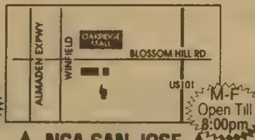
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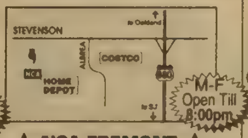
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- 256K Cache
- Embedded SCSI-2 interface
- MPC compliant
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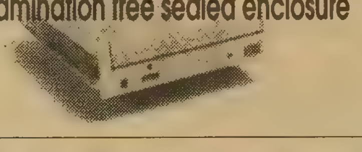

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- Caddyless
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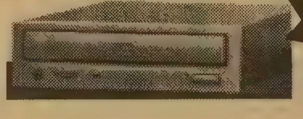

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- 16-BIT SOUND CARD, WAVETABLE UPGRADABLE
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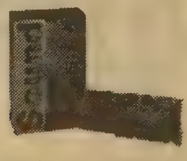

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DELUXE SOUND CARD

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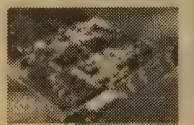
- WAVETABLE UPGRADEABLE
- COMPLETE SOFTWARE TOOL KIT
- CD-ROM INTERFACE



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INTERNAL QUAD-SPEED AT CD ROM DRIVE

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- 600KBYTES/SEC. TRANSFER
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- INSTALLATION SOFTWARE
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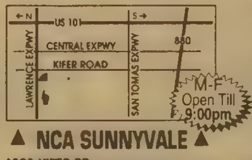

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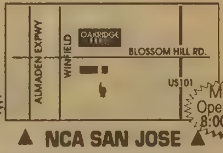

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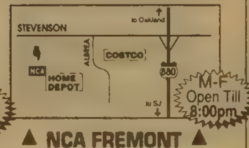

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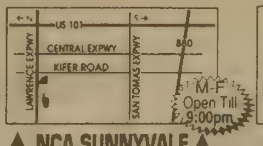

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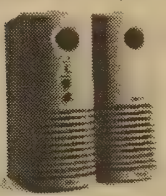

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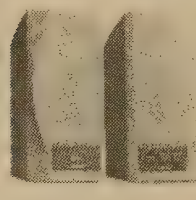

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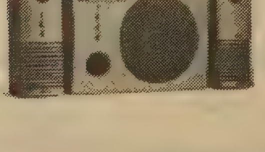

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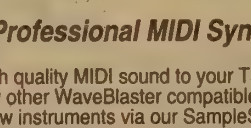

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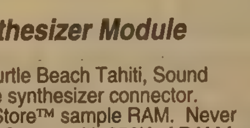

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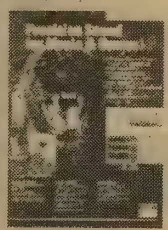

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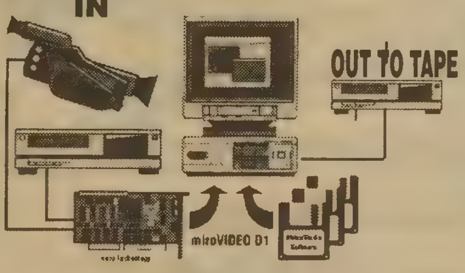

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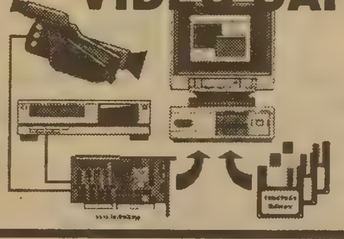

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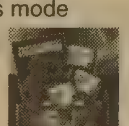

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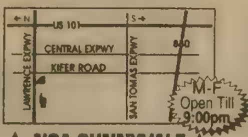

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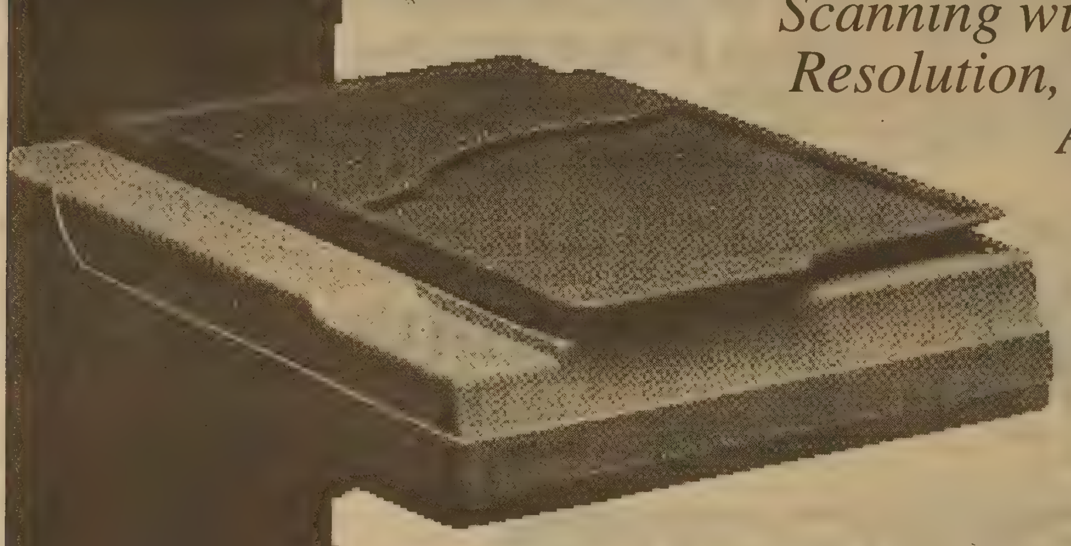

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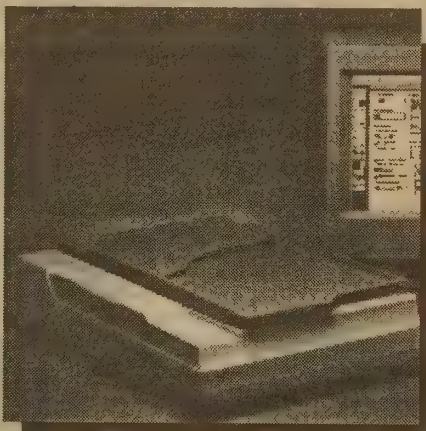

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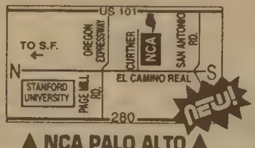
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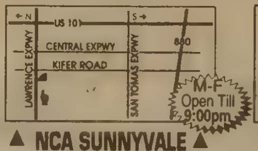
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KIFER ROAD
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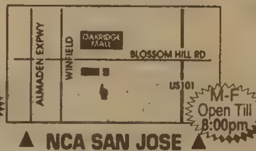
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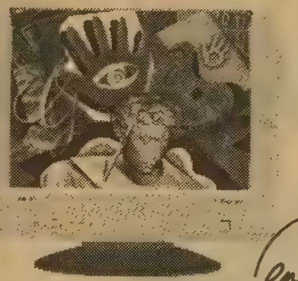

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486SL/33MHz 210MB/4MB RAM

NEW!

- SL Enhanced i486™ 33MHz
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- 2 PCMCIA Slots
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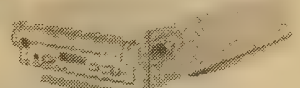

3Xi Internal SCSI CD ROM 450Kb/Sec. Transfer Rate 190ms Seek Time	**$369.95**
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Double-speed CD-ROM Reader

INCLUDES
Microsoft ENCARTA!

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- **300Kb/sec. transfer rate**
- 320ms access time
- 256K Cache
- XA ready
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- Includes CD-ROM interface, data cable, audio cable, & NEC Simple Start installation guide & video

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MultiSpin 3Xp Plus

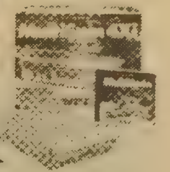
Triple-speed CD-ROM Reader

NEW!

- **500Kb/sec. transfer rate**
- 240ms access time
- 256K Cache
- Full audio controls & XA ready
- PC and MAC compatible
- Multisession Photo CD compatible
- Complete with SCSI cable & interactive tutorial CD

$379.95

MultiSpin 4Xi



Quad-speed CD-ROM Reader

EXTREMELY FAST!

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- **600Kb/sec. transfer rate**
- 220ms access time
- 256K Cache
- Full audio controls &XA ready
- CD-1 (FMV), video CD playback
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- Complete with SCSI data cable & interactive tutorial CD

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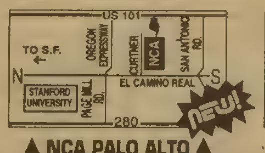

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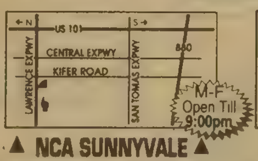

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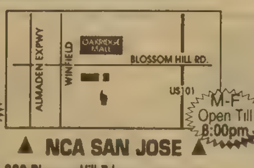

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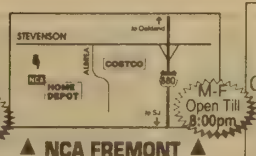

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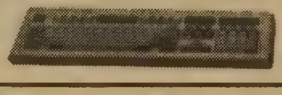

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SPECIALIZING IN COMPATIBILITY!!

IDEal PCI Cache Controller and Accelerator

ANOTHER PLUG-N-PLAY SOLUTION TO ENSURE OPTIONAL COMPATIBLITY & SPEED

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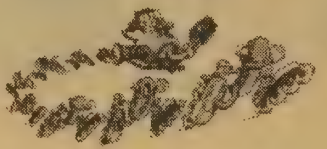

- 20MB ETR
- 4 IDE hard drives
- 4GB for all drives
- Ease of use, software programmable, NO jumpers

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IDEal VL-Cache Controller and Accelerator

Perfect for anyone with large files such as windows base applications, CD-ROM videos, and for those who HATE waiting for hard drive access!

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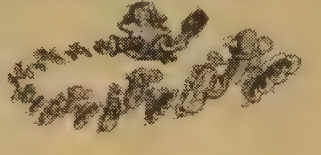

- Supports up to 16MB of on-board cache
- Supports up to four IDE Hard Drives
- Total capacity for alldrives is up to 2GB
- Compatible with DOS, Windows, OS/2 and major operating systems

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IDEal-ISA Cache Controller and Accelerator

Plug-N-Play solution to eliminate throughput bottlenecks, and not occupy CPU Time.

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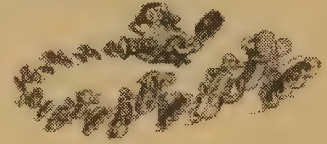

- Supports up to 16MB of on-board cache
- Supports IDE drives up to 4GB in capacity
- Supports up to 4 IDE hard drives
- Compatible with DOS, Windows, OS/2 and major operating systems.

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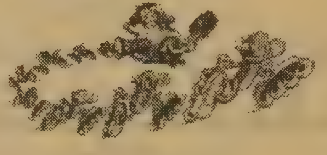
IDEAL -PCI™:The IDE Controller and Accelerator for PCI-Bus

Atronics again is the 1st to introduce new technology (PCI 8/93) and ensure Compatibility!

IDEAL *Controller*



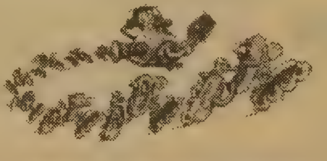
- ANSI ATA 3.0 compatible
- PCI version 2.0 compatible
- Compatible with DOS, Windows, OS/2 and major operating systems.
- 13MB maximum PCI-bus Data Transfer Rate
- Software programmable cycle times to adapt to different IDE transfer rates.
- Supports up to 2 IDE hard drives

$29

ATI-IDEAL Enhancer

Perfect buy with new hard drives!

IDEAL *Enhancer*



- Increase hard drive performance by 40-80%
- Plug-n-play for easy installation-NO software required
- No cables to connect, No jumpers to set
- It's hassel-free
- Increase your hard drive performance with multiple-sector transfer
- Compatible with all major operating systems

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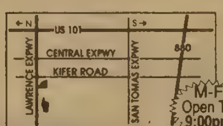

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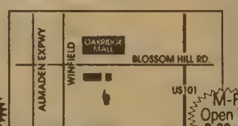

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Desktop Ink Jet Printer

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- 12 resident fonts (plus additional TrueType compatible fonts)
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- 40% more dots per inch than 300 dpi printers
- Windows ready
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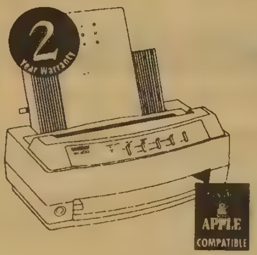

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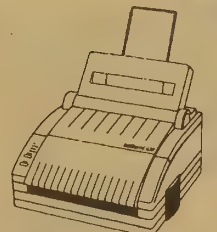
HL-630

Laser Printer

- 300 dpi
- 6 PPM-50% faster than 4 PPM engines
- Straight paper path
  - Reduces annoying jams & curls
  - Prints envelopes & various papers reliably
- 45 fonts
- 512 KB memory with Enhanced Memory Management
- Easy to use, low cost supplies
- 1 year limited warranty



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- 1MB RAM with Enhanced Memory Management
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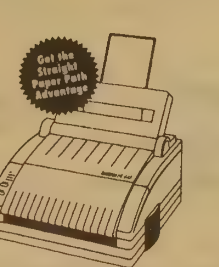
- Staight paper path
  - Reduces annoying jams & curls
  - Prints envelopes & various papers reliably
- Free ClickBook software-$69.95 value
- 1 year limited warranty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- Up to 45 fonts
- Apple Mac/IBM compatible
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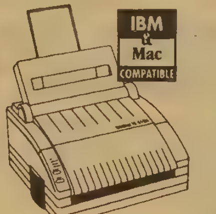
- 6 PPM-50% faster than 4 PPM engines
- Staight Paper Path
  - Reduces annoying jams & curls
  - Prints envelopes & various papers
- Free ClickBook software-$69.95 value



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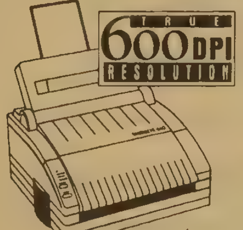
HL-660

Laser Printer

- 6 PPM Laser Printer-50% faster than 4 PPM engines
- Exclusive Straight Paper Path Technology
- 600 DPI resolution with advanced Photoscale Technology for sharp, crisp, professional output
- 2MB standard memory with Enhanced Memory Management
- Low cost supplies
- Optional BR-Script Level 2 (PostScript Level 2 Language Emulation)



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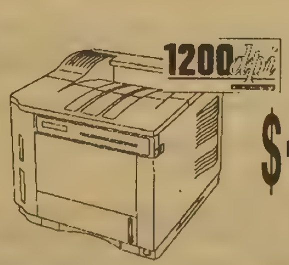
Laser Printer

- 12 PPM Laser Printer-50% faster than 8 PPM engines
- 1200 DPI Class graphical output
  - 600 DPI Resolution
  - Advanced Photscale Technology
  - High Resolution Control
  - 87 fonts & 11 bar codes
- PCL Level 5e/BR-Script Level 2 (Postscript Level 2 Language Emulation)
- Outstanding paper handling & optional duplexing unit
- NIO Slot for Network connectivity & third-party enhancements
- PCMCIA Type III slot for additional storage



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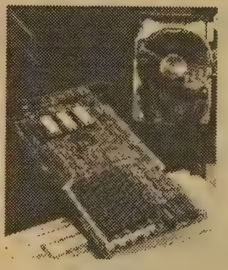

VESA IDE Caching Disk Accelerator W/ 512K Cache

- 2HD/2FD
- 512K On-Board (expandable to 1MB by adding four
- 256Kx4 DRAM)
- 16/32-Bit data transfer
- 15.6MB / Second transfer rate
- 0.1ms effective access time on average

DC-420VLB

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VESA IDE Caching Disk Accelerator w/2.88 Support

- 4HD/2FD, Floppy/Tape
- Accepts Standard 256K, 1MB, 4MB, /80ns SIMMS
- Expandable up to 16MB
- 19MB / Second transfer rate
- Primary or Secondary Controller
- 2.88 MB Floppy Support

DC-4030VL-2

$109.95

ISA IDE Caching Disk Accelerator W/ 512K Cache

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- 4HD/2FD
- 512Kb On-Board (expandable to 8.5 MB)
- Provides 2 SIMM Slots
- 5MB / Second transfer rate
- Accepts Standard 256K, 1MB, 4MB - 80ns SIMMS
- 0.1ms effective access time on average
- 2.88 MB Floppy Support

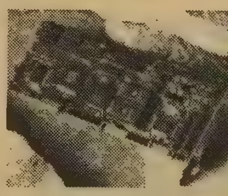
DC-200M

ISA IDE Caching Disk Accelerator

- 4HD/2FD
- Expandable up to 16MB
- 5MB/Second transfer rate
- 0.1ms effective access time on average
- 2.88MB Floppy Support
- Provides 4 SIMM slots

DC-200

$89.95



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- With its own CPU (80286) & Promise proprietary Bus Master chip, the DC440 delivers high speed DMA data transfers across the 32 bit VL Bus with minimal activity by the system CPU.
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- On-board BIOS for easy set-up
- Comes with Corel SCSI device drivers
- Added IDE interface
- Complete I/O support
- Extended 2 year warranty

DC440

$199.95

Enhanced IDE Disk Controller

- Complete enhanced IDE support
- Perfect solution for high capacity drives with onboard BIOS
- Controls up to 4 IDE devices including IDE CD-ROMS
- High-speed I/O
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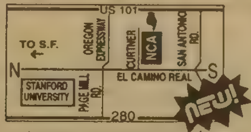

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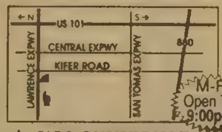

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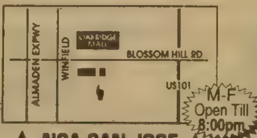

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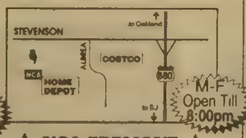

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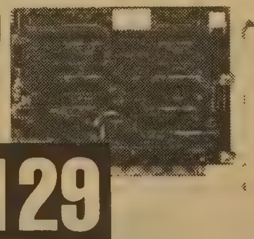

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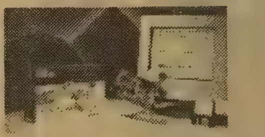

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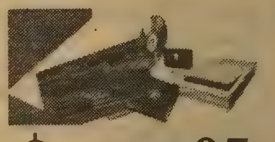

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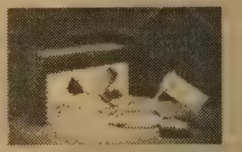

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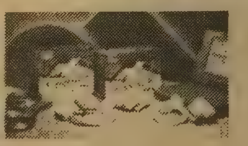

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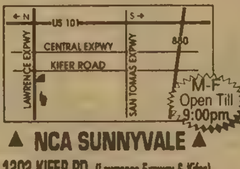

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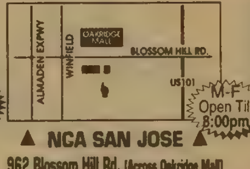

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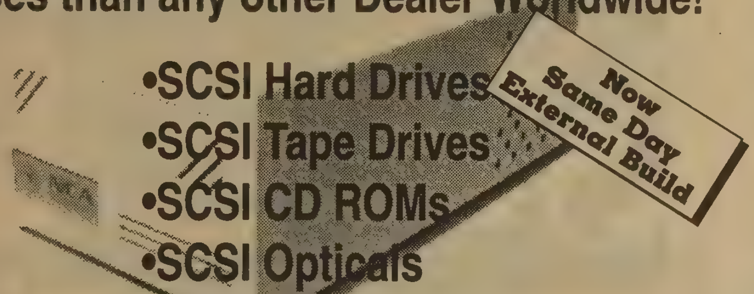

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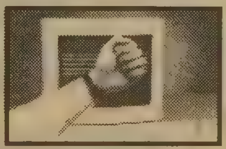

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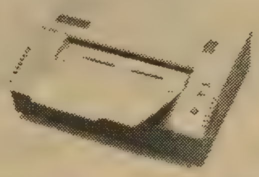

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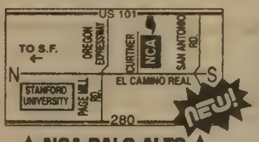

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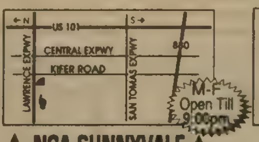

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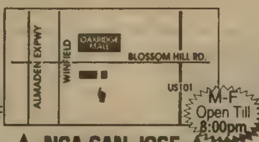

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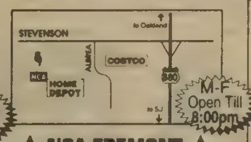

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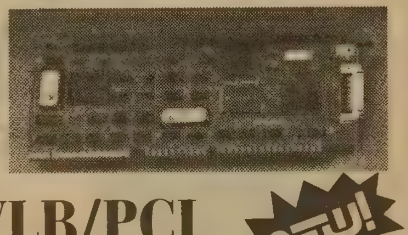

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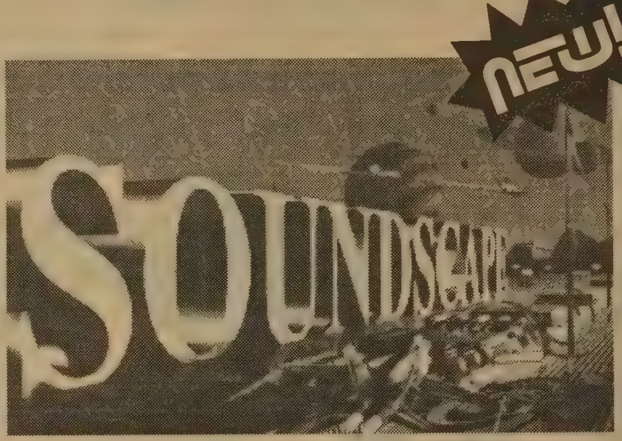
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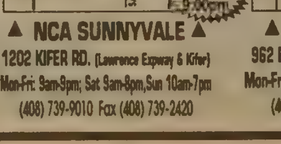
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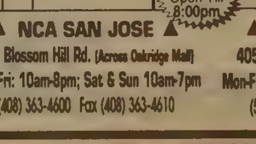
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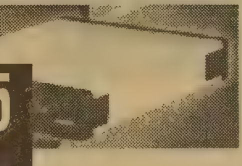

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14.4PB Int. MAC

14.4 Fax/Modem for PowerBooks

- 14,400bps FAX/DATA
- V.42bis/MNP 5 • 57,600 bps Max Throuput
- Caller ID, SilentAnswer™
- Works in PowerBook Models 100-180
- Software Includes:
  °Microphone™ LT
  °FAXstf™, °Compuserve
  °Information Manger™, °ARA Scripts • Manuals

$195.95

28.8i PB internal for PowerBooks $279.95

Prometheus

ProModem 144i for PC with voice

14,400 BPS DATA/FAX MODEM

The same great features are available for PC Windows users! The ProModem internal 14,400 bps fax/data modem features V.42bis data compression to transmit data at throughput speeds approaching 57,600 bps. Using V.42 error correction, data integrity is preserved while transmitting at the highest speed possible. Includes MaxFax, the send/receive fax software from Prometheus Products.

EXTERNAL FOR PC........$109.95

$89.95

NEW!

ProModem 144e with Voice External for MAC

14,400 BPS DATA/FAX MODEM

This external 14,400 bps data/fax/voice modem includes the complete version of MaxFax, the innovative software that turns your computer into a telephone answering machine and a send/receive fax machine. Use the ProModem to connect to on-line services, or to answer the phone and automatically receive a fax or record a voice message!

NEW!

$119.95

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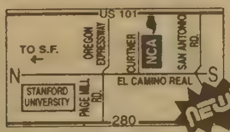

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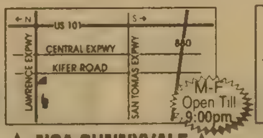

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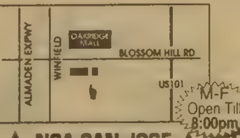

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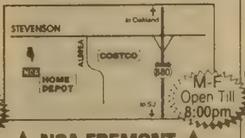

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QUALITY PRODUCTS

TekrAm

DC-320E

EISA Fast SCSI Host

With Hardware Disk Mirroring

Tekram Technology's DC-320E is an intelligent multi-tasking SCSI (small computer system interface) bus to EISA bus host adapter. The DC-320E supports up to 6 adapters with each adapter supporting up to 7 SCSI devices. In addition, the DC-320E provides hardware disk mirroring in all operating systems to ensure data saftey, as well as prevents the system's performance from downgrading during the multitasking operation throught its Disconnect/Reconnect feature.

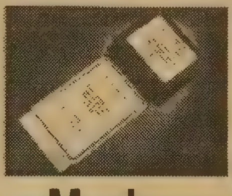
The DC-320E is both I/O register & command compatible with AHA 154x series, allowing it to run under any operating system that may already have Adaptec drivers built-in. The following operating systems are compatible:

- MS-DOS WINDOWS 3.x/NT
- OS/2.0
- SCO UNIX V3.2X
- SCO ODT V.1X/2.0
- SCO XENIX V2.3.X
- ISC UNIX V3.2
- AT&T UNIX SVR4.X
- USL UNIX SVR 4.2
- Sunsoft Solaris V2.1
- NextStep OS V3.1
- Banyan Vines(R) 5.00
- PICK 5.2.4

All versions of MS-DOS support 2 hard drives w/o additional device drivers. If MS-DOS 5.0/6.0 is used, the DC-320E offers special support to handle up to 8 devices, including fixed disk & removable media.

The DC-320E supports the ASPI driver for DOS and the NetWare driver. Also, the DC-320E provides a utility program which supports low-level format, mirroring initialization, and disk image copy/compare. With the installation software, drivers can be easily installed by automatically updating the CONFIG.SYS and AUTOEXEC.BAT files.

NOVALINK
TECHNOLOGIES, INC.



NOVAPAK 144

14.4 PCMCIA Paging, Data/Fax Modem with Voice Messaging

- Simplify your mobile communications with the NovaPak 14.4 the first product to integrate high speed wired and wireless communications in one Type II PCMCIA card.
- Send and receive alphanumeric messages and pages through any paging network. Send and receive fax messages from your hotel. Access your E-mail, download or send data through the high-speed modem. The NovaPak will also function as your personal voice mail system.
- For the professional on-the-go, no other communications device marries so perfectly with your notebook.

$389^{95}

NOVAMODEM 144

14.4 PCMCIA Data/Fax Modem with Voice

- 14,400bps modem/fax
- Page someone or send electronic mail messages
- Complete personal VoiceMail/Messaging system
- Includes software
- 5 year warranty

$129^{95}

VISIONMASTER™
iiyama

HI-RESOLUTION MONITORS

VISIONMASTER™ MF-8617

17"FST Monitor

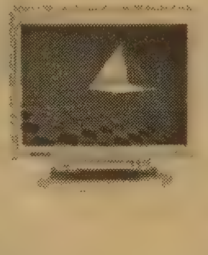
- .26dpi
- 80hz refresh
- Digital control
- Anti-glare coating
- MPR II low radiation
- EnergyStar compliant
- Three Year Warranty

$769^{95}

VISIONMASTER™ MF-8221

21"FST Monitor

- .28dpi
- DK Tinted Glass
- 1600X1200 resolution
- 24-85 KHz horizontal scan rate
- Microprocessor control
- Energy Star
- Auto contrast
- Color calibration
- Three Year Warranty



$1855^{95}

VISIONMASTER™ MF-8621

21"FST Monitor

- .26dpi
- A/R Bonded Panel
- 1600X1200 resolution
- 24-85 KHz horizontal scan rate
- Microprocessor control
- Energy Star
- Auto contrast
- Color calibration
- Three Year Warranty

$2255^{95}

VISIONMASTER™ MT-9121

21"Color Monitor

- 21" Aperture Grill CRT (Hybrid Trinitron)
- 1600X1200 Resolution
- 72Hz refresh
- 24.8-92.0 KHz horizontal scan rate
- Microprocessor and Remote Control
- On screen display
- Color Temperature-3 Modes
- Convergence control
- VESA DPMS/Energy Star
- 3 Year Warranty

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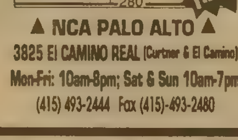

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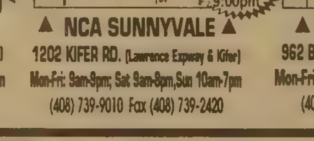

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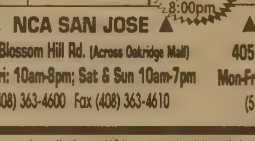

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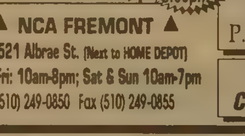

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QUALITY PRODUCTS

KENSINGTON

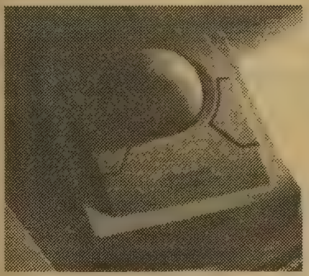
Thinking Mouse

NEW!

- Custom acceleration-zip your cursor across a big screen or slow it down for small detailed movements
- 4 Programable buttons
- Send keys-allows a series of keystrokes or commands to perform such tasks as printing a document, opening, closing and saving a file
- Pop-up menus allow you to create personalized menus for commands
- Brilian Cursor Technology
- Shortcuts to enter frequently used Windows or Mac commands
- Rest Reminder helps you schedule rest periods
- Application sets creates different sets of commands for different programs
- 5 year warranty

$99⁹⁵ FOR MAC **$89⁹⁵** FOR PC

Turbo Mouse 4.0



FOR MAC

- Award-Winning technology outperforms other trackballs and mice
- Superior hardware design for overall comfort and durability
- Introducing Brilliant Cursor and Slow Cursor technology for advanced cursor control
- Seven button functions and cursor keys maximize mouse performance
- Enhanced software enables custom acceleration for accurate cursor movement

$109⁹⁵

Expert Mouse 4.0

- First trackball with completely integrated hardware and software for total cursor control
- "Jump" cursor to any spot on screen with all new Brilliant Cursor technology
- Pixel by pixel cursor control with new Slow Cursor Technology
- Custom acceleration to match the way you work
- Programmable mouse buttons execute hundreds of command combinations
- Large, comfortable ball
- Easy to use click buttons
- Durable stainless steel bearings
- Reliable optical technology

FOR PC **$89⁹⁵**

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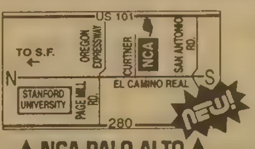
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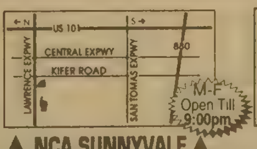
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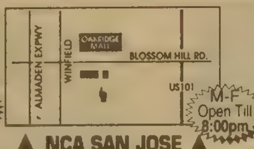
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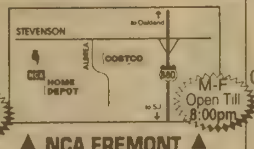
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QUALITY NAME PRODUCTS

BATTERY BTI® TECHNOLOGY

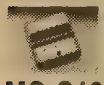
Batteries & Chargers for Portable MACs

BATTERY FOR POWERBOOK 100

MC-100
- •Compatible with Powerbook 100
- •Standard routine of one hour & fifteen minutes
- •Lightweight (approx. 7 oz.)
- •Qucik Lock design
- •Six month warranty

$55.95

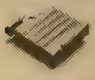
CHARGER FOR POWERBOOK 100 BATTERY



MC-C10
- •Lightweight(approximately 8 oz.) & small in size
- •Recharges using the original Apple AC adapter
- •May be used simultaneously with Powerbook 100
- •Twelve months warranty

$59.95

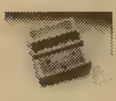
HIGH CAPACITY POWERBOOK BATTERY



MC-170
- •Highest capacity replacement battery available for PowerBook 140 to 180C
- •Up to 25% higher capacity than original Apple battery
- •Durable outer mold
- •Gold plated terminals, Quick-lock design plus terminal cover
- •Six months warranty

$65.95

POWERBOOK FAST CHARGERS



MC-CHR
- •Compatible with PowerBook 140 to 180C batteries
- •Fully charge a battery in 1.5 hours
- •Fully discharge(conditioning) function
- •Comes standard with cigarette lighter adapter and 110V AC adapter
- •Can utilize the original PowerBook AC adapter to power the charger
- •Twelve month warranty

$95.95

SLIMPACK LITE FOR POWERBOOK

MC-180S LITE
- •Compatible with Macintosh Powerbook 100 to 180C
- •Up to 4 hours of runtime
- •Charging LED indicator
- •Includes Attachment Kit w/long and short cable
- •Recharges using original Apple AC adapter

$99.95

AUTOMOBILE POWER ADAPTERS

AP-SERIES
- •Power your notebook from any 12V to 24V cigarette lighter socket
- •Portable and light weight (approx. 7oz.)
- •Twelve month warranty

AP100..................$89.95
AP200..................$49.95
AP500..................$85.95

SLIMPACK 4X FOR MACINTOSH DUO

MC-200S
- •Compatible with Duo 210 to 280C
- •No memory effect & maintenance fee
- •Comes with AC adapter to charge SlimPack
- •Includes Attachment Kit(not for use with Duo Dock) with cable
- •Powered by Hitachi sealed lead acid cells

$275.95

MINI AC ADAPTERS

MC-0732
MC-2410
- •Replaces original AC adapter
- •2.3"x4"x1.5"
- •Weighs approx. 8oz.
- •90V/264V, 50-60Hz auto switching
- •Comes standard with US version power cord
- •Twelve month warranty

MC-0732 For Powerbook.......$59.95
MC-2410 For DUO................$59.95

SLIMPACK 4X FOR POWERBOOK 500 SERIES

MC-500S
- •Compatible with PowerBook 520, 520C, 540 & 540C
- •Highest capacity external battery available
- •4X the internal battery run time
- •LED PowerGage, Charging LED
- •Charging time of 4 hours using PowerBook 500 AC adapter
- •High quality case
- •Low Battery Tone
- •Powered by Hitachi sealed lead acid cells

$310.95

RAPIDCHARGER FOR MACINTOSH DUO

MC-SC200
- •Comes standard with cigarette lighter adapter
- •Connects to Duo AC adapter for power
- •Optional 110V AC adapter for charger available
- •Compatible with Macintosh Duo type I, II & III batteries
- •Twelve month warranty

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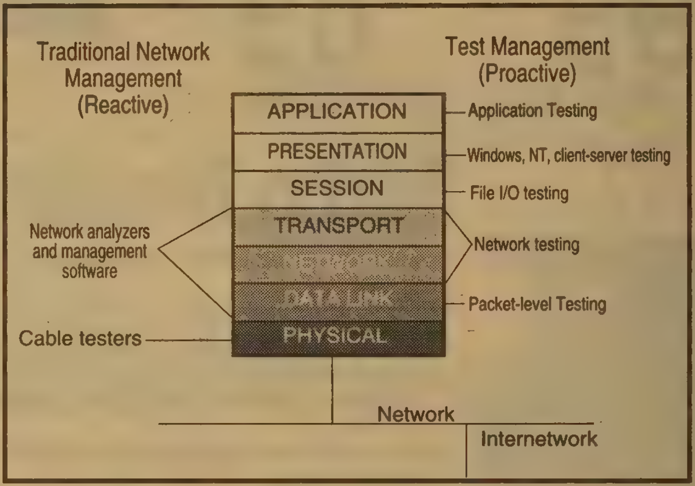
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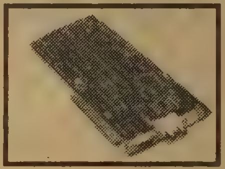

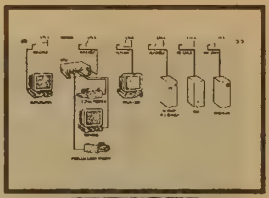

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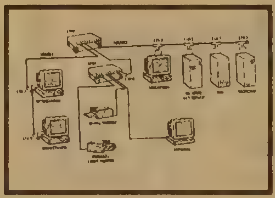

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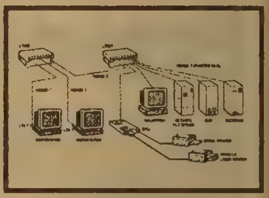

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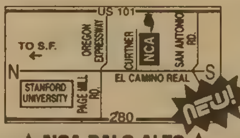
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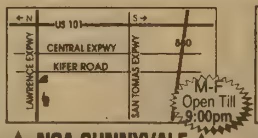
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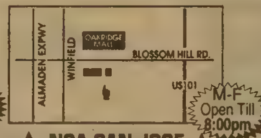
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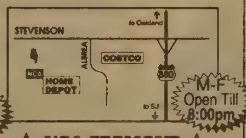
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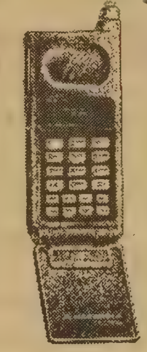

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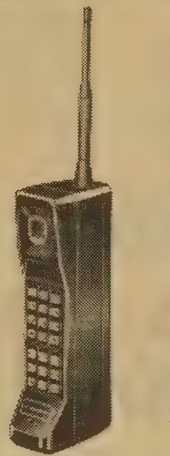

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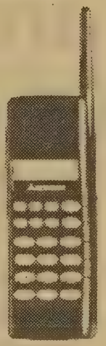

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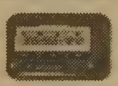

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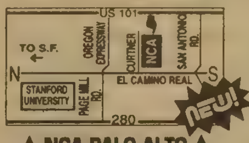

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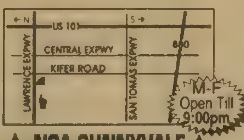

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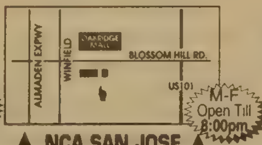

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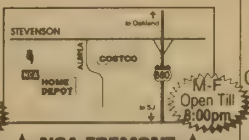

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BMUG REPORT

The Futurists Of BMUG

BY DAVID MORGENSTERN

This month's column lets the BMUG brain-trust put on their long-distance glasses and prowl far into the future—or next week, maybe. They will attempt to predict the winners and losers, the highs and lows, and the clones and groans coming in the year ahead.

Some of the themes and specifics may be a byte too technical for people who don't follow every twist and turn of the computer markets. If you don't know what a particular alphabet soup technology is all about, it's a safe bet that no one else does either. Just clip out the column, tape it to the refrigerator door, and write "in a pig's eye" next to any paragraph. Since only a member of the BMUG know-it-all peanut gallery would be so utterly confident, your guru status for the rest of the family and visitors will be assured!

Everyone has focused on ***Intel's*** actions in handling the ***Pentium*** mess. There has been hardly a mention of the glaring weakness in current ***business*** computing strategies laid bare by the Pentium incident. Almost all computing, business or otherwise, is married to a single computer ***architecture***, the flavors of processor from Intel Corp.

INTELligent Prognostications

The concerns about computational problems with Intel Corp.'s Pentium chip continued to ripple through the corporate swamp. However, the bad news did not seem to bring end-of-the-year sales to a halt. Users and the mainstream press in the PC camp seemed to be sleepwalking and went with the no-brainer decision—to stay the course.

The odd thing is that everyone has focused on Intel's actions in handling the mess. Who knew what and when has become the issue, with the only lesson being one of public relations. There has been hardly a mention of the glaring weakness in current business computing strategies laid bare by the Pentium incident.

Almost all computing, business or otherwise, is married to a single computer architecture, the flavors of processor from Intel Corp. The computers using the Pentium and various 'X86 chips comprise an overwhelming market share, even though they do not have as elegant and technologically advanced an operating system or hardware and software integration like the Mac.

So far, PC developers, clone manufacturers, and users have focused on the positive side of a dominant market position: low cost for component parts and add-ons from volume shipments, plenty of users with multiple needs, and a high level of competition between vendors in each market segment.

The down side is simply the dependence on the reliability of that single technology. Most of the world's computing is held hostage to a single company, with a single vision and technology. As we saw with the Pentium fiasco, if something goes badly wrong, all of an organization's computing can be suspect. Could any concern stand for all computing to grind to a halt for a day or week or longer?

The solution is not difficult to imagine, since it models the monopoly-breaking policies of the federal government. Businesses must diversify the computing platforms they support for every mission-critical purpose. If some problem is found with a particular central processing unit (CPU), then the critical functions of the organization can continue.

If big business and government systems management can get out from under the Intel and Microsoft dugout, we can start playing on a more level field. The changes in purchasing practices will provide an opening not only for Macs and other PowerPC systems, but an opportunity for workstations from Digital Equipment Corp., Silicon Graphics Inc., and Sun Microsystems Inc. as well.

And a side benefit will be the extension in sports clichés that we can use to describe the industry. Is it a rugby or football game? Or checkers?

Crystal Ball Bearings

Here are our prescient visions of the forthcoming year for your consideration. Remember that the predictions are designed solely for the reader's amusement. Under no circumstances should they be used as the sole basis for personal financial or computer purchasing decisions. We warned you!

•Raines Cohen, BMUG cofounder and User Group Connection guy:
The clones will bring to the Mac market all the great things PC users have experienced for the past decade and Mac users have been missing so far: confusion, technical support nightmares, difficult decisions, and more.

System 7.5 will become universal, despite the high price tag; new products that take full advantage of System 7.5's features will proliferate. PowerPC PowerBooks will make the scene. Expect the PowerBook 500 series to be killed by August, replaced by a new line with new battery technology.

"Full" (World Wide Web-accessible) Internet connections will increase, along with the number of Web publishers. Web browsers will merge with traditional online service client software. Current Internet users will move to 28.8K baud (V.34) connections at a minimum, with ISDN becoming popular for a few hard-core users. Web pages all over will be jammed when Prodigy, BMUG's Choice for Macintosh Specialty Store — Celebrating Our 10th Year

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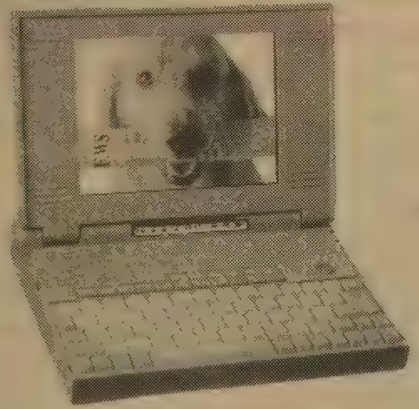

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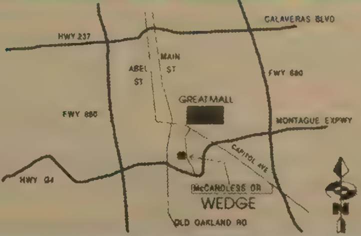

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New Mac software publishers will flourish, especially startups by millionaires who founded companies ten years ago and then cashed out five years ago; example: Silicon Beach Software cofounder Charlie Jackson.

Small user groups will affiliate or merge with larger ones in order to survive.

•Tim Holmes, BMUG board member and Apple employee:
Pippin, Apple's new multimedia player, sold via Bandai Co. Ltd. (a leading Japanese toy company) will sell three times as many units as was expected. Bandai predicted sales of five hundred thousand in the first year and two-thirds of that will be in Japan. The company will not be able to keep up with demand.

The multimedia market actually exists, and finally with this player, has the right audience, the Japanese market primarily, and the right company to sell it, Bandai. The device has a lot going for it, though there will be equal successes with the new Sega machine, the Saturn, and 3DO will also pick up speed as well—saving the skin of Trip Hawkins.

The market between "video games" and "computers" will blur into simply "home entertainment," although computers will certainly have their own market, albeit a small one.

Intel's problems will only worsen. Lawsuits are already being filed, and they will, in my prediction, be successful. The lawsuit money won't really damage Intel financially, however public perception will sway the market significantly—relatively speaking anyway.

The combination of Macintosh clone introductions and the bad image of Intel will boost Mac sales a minimum of five percent in a single year. And the success of the Pippin will further legitimize the Mac presence.

•Stephen Howard, former BMUG board member and *MacWEEK* editor:
Despite the hoopla from the Power Computing and Radius clones, Apple will gain no market share in 1995. Instead the company will hold steady at 8 to 10%. In fact, even after the cloners start shipping their machines, users will be unable to buy them reliably.

No one except video nuts will even want the Radius box, and Power Computing won't be able to build and ship enough Macs to fill demand from individual users.

Online services will become ridiculous this year, as they bend over backwards to grab new customers while looking over their shoulders in fear of Microsoft. Expect price cuts, exotic pricing plans and incentives, bizarre new services, and hype, hype, hype. Microsoft Network won't debut until the company ships Windows 95, so that gives the rest of the online industry eight months to prepare for the siege.

The shipment of OpenDoc this year is likely to be a bust, since—even more than is usual with new technology—there will be no user benefit without a bunch of compatible software available. There's perhaps a 5% chance that there will be some component software cool enough to excite interest this calendar year.

ClarisWorks will, by the end of the year, be a serious threat to Microsoft Office on both the Mac and PC. Claris is adding features as fast as it can, and the integrated package will still require about a tenth the disk space and a fifth the RAM of

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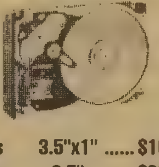

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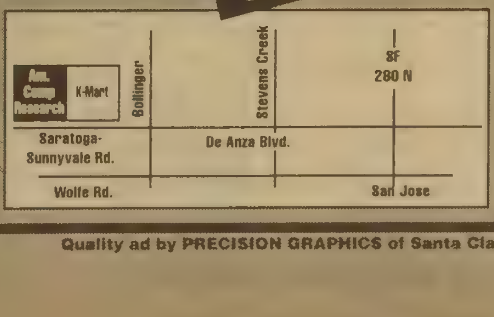

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When the PCI (Peripheral Component Interconnect) bus Macs ship in the middle of the year, there will be another go-round of product shortages for Apple CPUs. However, by the holiday season, there will be plenty of units, plus new models. The coolest things for Macs in 1995 will be the low-cost PCI add-in cards. My bet for the hot sellers are PCs-on-a-card, like the ones Apple, Reply, and Orange Micro sell today, plus MPEG decoders that play digital video of acceptable quality from a CD-ROM.

•Dan Meriwether, BMUG Internet SIG moderator and Internet consultant: Similar to the rush toward multimedia in the early '90s, I see the Information SuperHypeway, especially the World Wide Web, being an area with tremendous potential for bad investments, wasted capital, and badly thought-out plans. Slickly named, but half-baked venture-capital-fueled companies will spring up with plans for exploiting extant Web shareware products. Other start-ups will offer things as URL registrars and pointer rental services, or Web-server space rental.

Following the lead set by AOL, commercial establishments with ultimately sinister high-profit-based intentions will purchase large chunks of Internet wire, though 1995 should see little, if any, effect from this.

Data encryption and secure-channel communication will continue to be one of the fastest-paced and most lucrative areas of Net development. Credit card companies, banks, and Micro-something will lead the way in stifling the beginnings of the grass- roots, democratic, and universally beneficial Internet barter system. Keep a very sharp eye out for services that offer a test account to the first X-number of applicants, such as *Wired* magazine's *HotWired*.

This year, interapplication communication, primarily through Apple Events such as Get URL, will become more common; as will use of universal Net-application Preference files.

In the end, 1995 will be known as the year of the busy server. Already many servers are faltering under the load of the ever increasing growth of the Internet. Getting onto Aladdin's FTP space on Netcom is already a quick introduction to the HTTP error 202, "server is busy or not responding." Some of the more popular services will suffer an unsustainable upgrade schedule, while others will severely restrict access of operation to use fewer resources during peak hours.

•David Morgenstern, BMUG cheerleader: This year, the increasing number of individuals with multiple personalities will provide the impetus for additional Newton devices. Roseanne, the multi-persona celebrity, will introduce new models, code-named Freaky Friday, at the Macworld Expo in Boston. The devices will include automatic human-character-sensing technology, based on handwriting analysis.

Instead of being confined to the current primary and guest patterns, the palmtops will support unlimited sets of writing versions. Newton info management will help each personality to track what the others are doing and have scheduled on the calendar, as well as providing separate email log-ons and encryption technologies for each "user."

The number of high-tech television shows will skyrocket later in the year, with the most popular being the ComdeX-Files, a program that explores strange and unusual RAM states and software interactions. Although starting slow, the viewer ratings will skyrocket when the show's producers are sued by the porno publisher offering the Comdex XXX-Files CD-ROM.■

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What Is BMUG?

BMUG is an educational, nonprofit, consumer advocacy group organized to share information and provide critical direction to users and developers in the computer community worldwide. It is an independent advocate, not affiliated with any manufacturer, delivering trustworthy information and useful products.

Like any growing organization, it is many different things to its fifteen thousand international members. BMUG supports many special interest groups (SIGs), 18-line Planet BMUG and 11-line BMUG Boston BBSes, a software library, weekly meetings, publications, and much more. BMUG also puts out a semi-annual 500-page book that we call our "newsletter."

Our motto continues to be: *We're in the business of giving away information.*

Come and join in the dialogue at the BMUG main meeting every Thursday evening, 6:30–9:30 (or whenever we finish), on the UC campus. BMUG West and BMUG South are monthly meetings held in San Francisco and San Jose. Check the Announcement Line at (510)549-2684 ext. 8.

The BMUG Office, 2055 Center Street (a half block from the BART station), is open to the public 8:30 am–4:30 pm. Please come by, say hello, and meet other members.

The BMUG Helpline provides volunteer technical assistance and telephonic hand-holding for our members. If your question can't be answered on the spot, we try to get you in touch with someone who can help. Improve your Macintosh education and help others by becoming a Helpline volunteer!

BMUG has one of the most up-to-date, comprehensive software libraries around with hundreds of disks filled with the latest versions of public domain or shareware programs. BMUG also produces CD-ROM collections, including the digital video *TV-ROM ™Too*, and the *BMUG PD-ROM.*

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BMUG can be found on most online services, including e•World. BMUG can also be reached through the Internet network at *UG0001@applelink.apple.com* .

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Windows 95—The Ongoing Saga

Microsoft Is Allowing Its Beta Testers To Share Our Experiences And Opinions.

BY WOODY LISWOOD

It is no longer new news that Windows and MS-DOS are being merged into what Microsoft has decided to call Windows 95. Even though it is not yet available in the market, Microsoft has released beta testers from our non-disclosure agreement so that we can share our experiences and opinions. I'm currently working with my third release of Windows 95, called Beta 2.

Although Windows 95 is my system of choice, since it is still beta software and not everything works all of the time I keep Windows 3.11 close by on a separate hard drive so I do not risk any damage to that system. All I need to do is switch the cable to the other drive. If I must do something and Windows 95 has crashed, I can revert to Windows 3.11 to complete my work.

> *Microsoft's* TWO MAIN CLAIMS ABOUT *Windows 95* IS THAT IT IS EASIER TO USE FOR THE END-USER AND BETTER FOR THE *MIS* USER.

Microsoft's two main claims about Windows 95 is that it is easier to use for the end-user and better for the MIS user. (In a future article I will explore if Windows 95 is better for MIS.) The new, end-user features include plug-and-play, long file names, and a new user interface. I wholeheartedly welcome the introduction of long file names. I've been fighting traditional MS-DOS file names longer than I care to remember. But so far, I'm not convinced that all of this really is "easier" for the end-user.

Plug-And-Play

Plug-and-play, if it works, will be a delight. This will mean that when you install hardware, Windows 95 will recognize it and then configure it correctly for your system, eliminating the hours of time you might spend sorting out things like memory address and IRQ conflicts.

As much as Microsoft hopes to provide backward compatibility for hardware and software that runs under Windows 3.11, they still have some work to do. For instance, support for graphic boards based on the Hercules AGX graphic chip has been removed. Likewise, Windows 95 did not recognize—and thus could not correctly install—my Sound Galaxy.

I also had problems with the backup system. Although the latest beta version now supports tape drives, I was unable to get the tape backup software to work. Interestingly, Qbackup, from Iomega, now works as specified even though it did not work in the previous releases.

For telecommunications, Procomm2 for Windows let me work online, but when I tried to work with its menu structure nothing worked properly. Plus, whenever I would exit Procomm the system would lock up.

HyperAccess for Windows did not cause the system to lock up, or at least not at this stage. However, it would not let me download anything or let me change its floating icon bar. (Within Windows 95 is a program called Hyper Terminal, a stripped-down version of HyperAccess, which Microsoft calls an example of a well-behaved communication program in the 32-bit environment.)

Similar to Windows 3.11, there are a variety of applets included with Windows 95. These applets are competent, but most are not sufficient for using on a daily basis.

At this stage, I can say that Windows 95 is definitely workable. There are still problems to be resolved, but the system is beginning to be usable for me.

User Interface

A lot of attention has been focused on its new user interface. Microsoft claims to have spent a lot of time watching people use Windows and has changed the interface for the better. But what does this really mean?

In looking through the beta documentation I discovered this statement: "Less-experienced users find the plethora of overlapping Windows, minimizing and maximizing too complex to easily master." Who were they watching? I've been teaching people how to use Windows for years, as well as providing support for an entire company, and don't recall ever hearing a user complain about those problems.

The new interface presents a series of cascading, side-coupled boxes filled with arrow icons leading to more cascading boxes. OK, I can live with that. But, when I exit one set of boxes it simply returns me to the main work area. So, if I am four cascading menus deep, I must now repeat the entire process to get back to where I was. Remember, this is beta software and things might change before the final release, but I find this new feature frustrating, counter-intuitive, and time wasting.

For anyone who has used Windows 3.11, the new icons themselves can be a problem. It used to be, if you deleted an icon, you deleted an icon. Under Windows 95, when you delete an icon, all of the underlying files and connections are also deleted. I discovered this change when the icon I dragged to the trash took with it an application and about 18MB of related files.

Luckily, I did this in a beta version where the trashcan was not working properly. The trashcan seems to have become a recycle bin, storing up to approximately 10% of the

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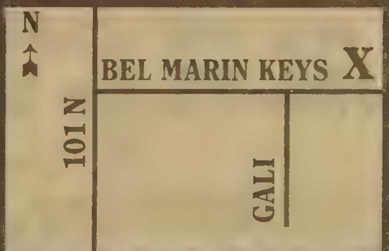

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A button in the left corner of the desktop is where you start working with Windows 95. When clicked, this button opens your first vertical menu that lists things like run, programs, settings, etc. A variety of program icons can be located on this vertical menu. A separate menu for shortcuts to your programs can be set up on this bar. I did not find this feature very exciting or new—it is like having an applications group with all your favorite or commonly used programs in it. I suppose this is what Microsoft calls a better user interface. I don't necessarily agree that this is better, only different.

Microsoft CLAIMS TO HAVE SPENT A LOT OF TIME WATCHING PEOPLE USE *Windows* AND HAS CHANGED THE INTERFACE FOR THE BETTER. BUT WHAT DOES THIS REALLY MEAN?

Along the bottom of the screen, each task you run is listed on a bar. This bar is always visible and you can open, switch to, or close applications from that bar. I enjoy this part of the new interface. Now when an application locks up while it is running, I can click on its name on the bar and close it. I will not be forced to always reboot the computer after a program crashes.

Other Issues Of Concern

In the performance arena, all users will find that the 32-bit architecture will increase performance. As the major vendors upgrade applications to be 32-bit compliant, more significant performance gains will be seen. The few MS-DOS applications I still use do run better under Windows 95 than v3.11. For multimedia applications, that video and sound will be improved and run smoother. Also, the printing engine runs much faster.

Odd things do happen. I was adjusting the colors for my display background, just experimenting around to see if I liked things better than the default colors. I now have the mouse icon for my display icon rather than the display icon which was the default. I can't figure out where the old icon went, or why I now have a mouse. I'll report that one tomorrow when I'm online with Microsoft.

The printer drivers are still having problems. The stylus driver only gives me garbage, but I am not sure if the problem is in Windows 95 or the printer. It did work perfectly under v3.11. In addition, the HP LaserJet II driver occasionally has printer port problems. If I reboot, this problem goes away.

Lastly, I dislike the cheapo display card I have had to switch to. It is slow and causes problems with some background display. But, at this stage, my Hercules cards don't work with 95, so I'm stuck unless I break down and acquire an accelerator card which is supported by 95.

I plan to be doing this regularly, keeping you informed as to the state of Windows 95 and how the beta is developing.■

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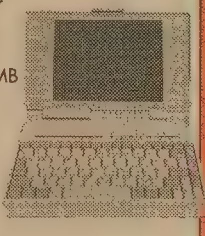

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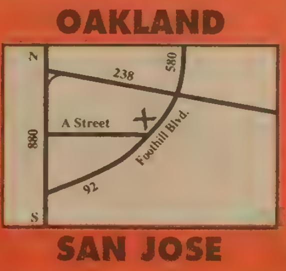

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- **Intel Pentium P54C** 90/100MHz Processor
- **DUAL Pentium** PCI/EISA Motherboard
- **512KB** high speed Write back static cache
- **32MB** 70ns **w/Parity** (2x4Mx36)
- Seagate 2.1GB Fast & Wide SCSI-3 **(20MB/sec)**
- **Toshiba** 3501B 4X SCSI-2 CD-ROM
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- 21" **ViewSonic 21** .25dp 1600X1280 Flat Monitor
- **Diamond Stealth64** w/4MB VRAM
- GT-300 Case 300W PS Triple Fans and side doors
- 101 Enhanced Key Tronic keyboard
- **Microsoft** Ergonomic mouse
- 3-PCI and 5-EISA Expansion Slots

90MHz Pentium
$6695 **$220/month**

100MHz Pentium
$6995 **$228/month**

Things That Make You Go Hmmmm!!! #4

At Now We Care To Educate You!

■ Check this out, there is a new breed of hard drive described as "Thermally Calibrated" hard drives, designed for use in multimedia applications. For those who don't know what this is, here is an overview. Thermal Calibration is the process by which the hard drive maintains the data heads at an optimal position over the data cylinders. This is done by breaking the calibration process into smaller components and eliminating video frame drop outs and jerkiness. Hard drives that do not have this feature will require a longer time to complete a thermal calibration over the cylinder, long enough to cause an interruption of the data flow which results in disc-related audio or video drop-outs and jerkiness. Many of our high-end computers integrate Thermally Calibrated Hard drives.

■ Windows For Workgroups 3.11 has a nice feature that many of you might not have known about, or simply can not use. If you go into the "Control Panel" under "386 Enhanced" then choose "Virtual Memory"... and then click on "Change", you will see two boxes, one reads "Use 32-bit Disk Access" and the other reads "Use 32-bit File Access". Enabling those two could increase your system's performance by 50%. Enabling the "Use 32-bit Disk Access" will cause Windows to interact directly with your hard drive, however, unless your hard drive and controller are designed to take advantage of this feature you will not be able to use it. (e.g. SCSI Hard drives). On the other hand, a "32-bit File Access" is a feature that everyone should be able to utilize. (For more info regarding this issue, contact Microsoft Fast tips at 800-936-4200).

■ Internet is becoming a buzzword to everyone these days, from children to adults to seniors, although few actually understand how the Internet works, but all have the intention to learn. It is quite interesting to know how the Internet initially started, and here is the story. In the early 1960's, because of fear of a Nuclear attack, the pentagon asked computer scientists to find a way for an unlimited number of computers to communicate together-without relying on a single computer or "Head" to control them, so that in case one part got hit the others will stay alive. Quickly, after this technology was implemented in research labs, it expanded to dozens of universities and corporations creating what is called today the Internet. Now and with the help of TCP/IP, Internet traffic can move over almost all physical channels, telephone lines, Cable TV, Satellite links, wireless phones and fiber optic trunks to all types of mainframes, workstations and PCs, reaching millions and millions of people all over the world.
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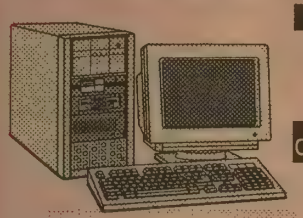

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- 200/233/275Mhz Processor speed
- 2MB Secondary Cache 12ns
- 16MB 72-pin 60ns RAM up to 512MB
- **Micropolis** 1.0GB Fast SCSI-2 9ms
- **Toshiba** 3501 **Quad** Speed CD-ROM
- Integrated Fast SCSI-2 controller
- 17" **ViewSonic** 17 .27dp NI Monitor
- **ATi Graphics** Ultra Pro 2MB VRAM
- Tower Case with 300W Power Supply
- 101 Enhanced Keyboard
- 2.88MB FDD, PS/2 Mouse
- 3-PCI and 3-ISA Expansion Slots
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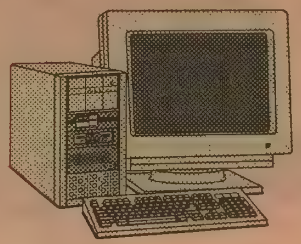
Dual RISC R4400 Graphics/NT SuperStation-NEC RISC 2000 21" NEC 6FGp Monitor



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- **NEC 3Xi** Triple Speed SCSI-2 CD-ROM
- Integrated 64-bit LB Fast SCSI-2 interface
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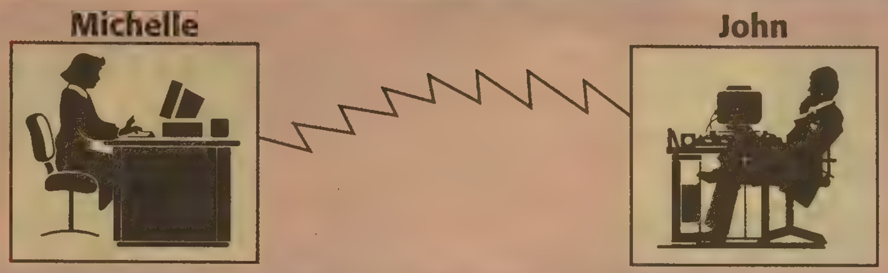

San Francisco, California ***New York, New York***

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- **Car Rental ....("$2.59 a gallon!! Are you kidding?")**
- **One night at an expensive hotel ....("Hmm... I wonder what these in-room movies cost?")**
- **and parking fees ....("Where did this dent come from? Huh? What limited-liability clause?")**

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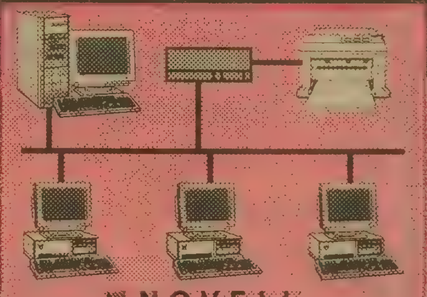

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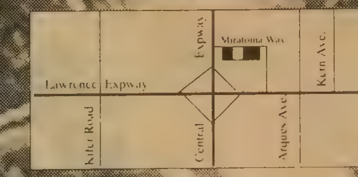

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540MB IDE	CFA540A	12MS	3.5"X1"	$229
850MB IDE	CFA850A	12MS	3.5"X1"	$369
1.08GB IDE	CFA1080A	9.5MS	3.5"X1"	$559
1.27GB IDE	CFA1275A	12MS	3.5"X1"	$499
540MB SCSI	CFA540S	12MS	3.5"X1"	$279/379
1.0GB SCSI	CPF1060S	<10MS	3.5"X1"	$549/$649
1.0GB SCSI	CPF1060W	<10MS	WIDE	$799/$999
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540MB IDE	WD2540	13MS	3.5"X1"	$259
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4PLEX	INT/EXT	SCSI	4X	FAST 1MB	SCALL
NEC					
2VI	INT	SCSI	2X	300K	$170
3XP PLUS	EXT	SCSI	3X	Triple Speed	$380
4XI	INT/EXT	SCSI	4X	Quad Speed	$379/$479
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3401B	INT/EXT	SCSI	2X	300K/200MS	SCALL
3501B	INT/EXT	SCSI	4X	600K/190MS	$379/479
SONY					
CDU-55E	INT	IDE	2X	300K/250MS	$139
CDU-33A	INT	INCL	2X	Card/Cables Incl	$135
TEAC					
SuperQuad	INT	INCL	4X	Quad Speed	$319
PIONEER					
DRM-604x	EXT	6Disk/SCSI	4X	612K/300MS	$959
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1GB	Cart	Glass/Poly		$195
HEWLETT PACKARD				
C1716T	FAST	1.3GB	SCSI	$2380
C2550	FAST	1.3GB	SCSI	$2799
1.3GB	Cart	Optical		$129
FUJITSU				
M2512A	3600RPM	230MB	SCSI	$780/920
SyQuest				
SQ5110C	88MB	SCSI	5.25	$240/$459
SQ3105S	105MB	SCSI	3.5	$252/$405
SQ3105A	105MB	IDE	3.5	$189
SQ200C	200MB	SCSI	5.25	$380/$599
SQ270A	270MB	IDE	3.5	$319
SQ270S	270MB	SCSI	3.5	$350/$529

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AHA-1522A	7HD/2FD 16 bit kit	$139
AHA-1542CF	SCSI Master Kit	$242
AHA-1542C+	SCSI Masterw/ Corel SCSI	$314
AHA-1640	MicroChannel	$299
AHA-2742AT	EISA SCSI Master	$365
AHA-2842VL	VESA SCSI Master	$249
APA-460	PCMCIA Slim SCSI	$285
AHA-2940	PCI SCSI Master	$279
AHA-2940W	PCI SCSI Master WIDE	$359

BusLogic

BK545S	Fast SCSI ISA kit	$209
BK445S	VL BUS Fast SCSI kit	$199
BK747S	EISA Fast SCSI kit	$369
BK946C	PCI Fast SCSI kit	$239
BK510	ISA IDE Cache Cont	$95
BK410	VLB IDE Cache Cont	$135
BK910	PCI IDE Cache Cont.	$178

FUTURE DOMAIN

TMC850	8-bit w/ BIOS	$59
TMC1670	16-bit SCSI SVP	$149
TMC1680	16-bit SCSI 7HD/4FD	$140
SCSI2GO	PCMCIA TYPE 2	$275

NETWORK/FAX/MODEMS

3Com

		Price
3C503 Etherlink II	16bit 10BaseT/Coax	$169/174
3C509 Etherlink III	10BaseT or Coax	$119/5Pk-539
3C509 Etherlink III	16bit Combo	$138
32bit EISA Etherlink III	10BaseT or Coax	$229
3C589 PCMCIA	10BaseT of Combo	$195/245

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	Worldport	$289
Sportster 28,800 V.34 Int/Ext		$239/$259

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Model	Specs	Capacity	Interface	INT/EXT
CONNER				
2750	INT/EXT	1.3GB	SCSI	$795/$899
4320NT	INT/EXT	2.0GB	SCSI	$799/$899
4324RP TURBO	Large Cache	4.0GB	SCSI	$929/$999
Tapestor 250	DC2120	250MB	Floppy	$125
Tapestor 250	DC2120	250MB	ParrPort	$279
Viper 1/4" Tapes				
2150S	INT/EXT	250MB	SCSI	$320/$422
2525S	INT/EXT	525MB	SCSI	$459/$555
HEWLETT PACKARD				
35470	INT/EXT	2.0GB	SCSI	$799/$899
35480	INT/EXT	4-8GB	SCSI	$885/$995
C1553A	INT/EXT	4-16GB	SCSI	$1099/$1199
WangDAT				
3100DAT	INT/EXT	2.0GB	SCSI	$849/949
3200DAT	INT/EXT	4-8GB	SCSI	$899/999
3400DX DAT	INT/EXT	4-8 GB	SCSI	$999/1099
WANGTEK				
5150S	INT/EXT	250MB	SCSI	$399/499
5525S	INT/EXT	525MB	SCSI	$539/639
COLORADO MEMORY SYSTEMS INC.				
DJ-10	JUMBO-120	120MB	Floppy	SCALL
DJ-20	JUMBO-250	250MB	Floppy	$145
DJ-35	JUMBO-350	350MB	Floppy	$189
DJ-25	JUMBO-700	700MB	Floppy	$269
FC-10	Controller	w/ Cables	Int/Face	$79
TC-15	Controller	w/ Cables	Hi-Perf	$169
Parallel Port External Back-up Drive				
Trakker120	EXT	120MB	ParrPort	$280
Trakker250	EXT	250MB	ParrPort	$320
Trakker350	EXT	350MB	ParrPort	$370
Trakker700	EXT	700MB	ParrPort	$482
EXABYTE®				
FS1G	INT/EXT	1.5GB	SCSI/Kit	$735/$899
2501	INTERNAL	UNIT	ONLY	$522
EXB-8205	INT/EXT	2.5GB	SCSI	$1349/$1599
EXB-8505	INT/EXT	5.0GB	SCSI	$2079/$2499
EXB-8500	INT/EXT	5.0GB	SCSI FH	$2299/$2599
EXB4200	INT/EXT	2.0GB	SCSI	$849/949
EXB-4200C	INT/EXT	5.0GB	SCSI	$949/$1040

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			PRICE
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2V	1024X768	14"	$320
3V	1024X768	15"	$488
XE15	1024X768	15"	$548
XE17	1024X768	17"	$955
XE21	1024X768	21"	$1989
XP15	1024X768	15"	$698
XP17	1280X1024	17"	$1259
XP21	1600X1200	21"	$2499
NOKIA CONSUMER ELECTRONICS			
449E	1024X768	15"	$489
447L	1280X1024	17"	$789
447X	1600X1280	17"	$999
445M	1280X1024	21"	$1999
445X	1600X1280	21"	$2599
ViewSonic®			
15	1280X1024	15"	$405
17	1280X1024	17"	$880
20	1600X1280	20"	$1445
21	1600X1280	21"	$1699
HITACHI®			
15Pro	1280X1024	15"	$429
Elite17	1600X1200	17"	$980
20s	1280X1024	20"	$1190
PRO21	1600X1280	21"	$1999
SONY			
GPD-15sf	1280X1024	15"	$420
GDM-17SF	1280X1024	17"	$889
GDM-17se1	1600X1200	17"	SCALL
GDM-20se	1600X1200	20"	$1860
NANAO			
F340i.w	1024X768 NI	15"	$629
F5550i.w	1280X1024 NI	15"	$925
F560i.w	The GREEN MONITOR	17"	$1199
T560i	1280X1024 NI	17"	$1395
T660i	1280X1024	20"	$2095
F760i	1280x1024	21"	$1885
MAG			
DX15F	1280X1024 NI	15"	$369
DX17F	1280X1024 NI	17"	$669
MX15F	1280X1024 NI	15"	$449
MX17FG	GREEN LOW RAD NI	17"	$849
MXP17F	1280X1024 NI	17"	$949
MX21F	1600X1200 NI	21"	$1849

VIDEO CARDS

DIAMOND	
STEALTH 64 DRAM VLB/PCI 1MB	$179
STEALTH 64 DRAM VLB/PCI 2MB	$219
STEALTH 64 VRAM VLB/PCI 2MB	$319
STEALTH 64 VRAM VLB/PCI 4MB	$469
VIPERPro PCI 2MB/VRAM	$429
VIPER SE VLB/PCI 2MB	$359
VIPER SE VLB/PCI 4MB	$509
SPEEDSTAR 64 PCI/ISA 1MB/DRAM	$149
SPEEDSTAR 64 PCI/ISA 2MB /DRAM	$199
SPEEDSTAR PRO VLB/ISA 1MB/DRAM	$119
STEALTH 32 DRAM PCI/VLB 2MB/DRAM	$189
matrox	
MGA IMP/LTE/PCI 2M	$319
MGA IMP/LTE/VLB 2M	$349
MGA IMP + /PCI 2M	$389
MGA IMP + PCI 2M BULK	$329
MGA IMP + PCI/220	$489
MGA IMP+ A/220 ISA	$529
MGA IMP + A ISA	$539
IMP+ MODULE UPGRADE NEW PCI/ISA	$229
ATI TECHNOLOGIES INC	
Graphics Ultra Pro Turbo 64 PCI/4MB	$589
Graphics Ultra Pro Turbo 64 PCI/VLB/2MB	$379
Graphics Ultra Pro PCI/2MB	$299
Graphics Ultra Pro VLB/2MB	$299
Graphics Ultra Pro EISA/2MB	$329
Graphics Ultra Plus 2MB	$215
Number Nine Computer Corporation	Price
9GXe L-10 ISA/IMB	$255
9GXe L-11 VLB/ISA/2MB	$349
9GXe L-12 VLB/ISA/3MB	$413
9GXe L-14 ISA/4MB	$349
9GXe 64 PCI/VLB/1MB	$179
9GXe 64 PCI/VLB/2MB	$249
9GXe 64 Pro PCI/VLB/2MB	$349
9GXe 64 Pro PCI/VLB/4MB	$499
Hercules	
HG 720 VLB/2MB	$319
HG310 ISA/1MB	$209
HG610 VLB/1MB	$249
S 501 VLB/1MB	$139
S 801 PCI/1MB	$129
D 601 VLB/1MB	$159
D 602 VLB/2MB	$219
D 702 VLB/2MB	$229
D 902 PCI/2MB	$239

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Product Spotlight

UPDATES

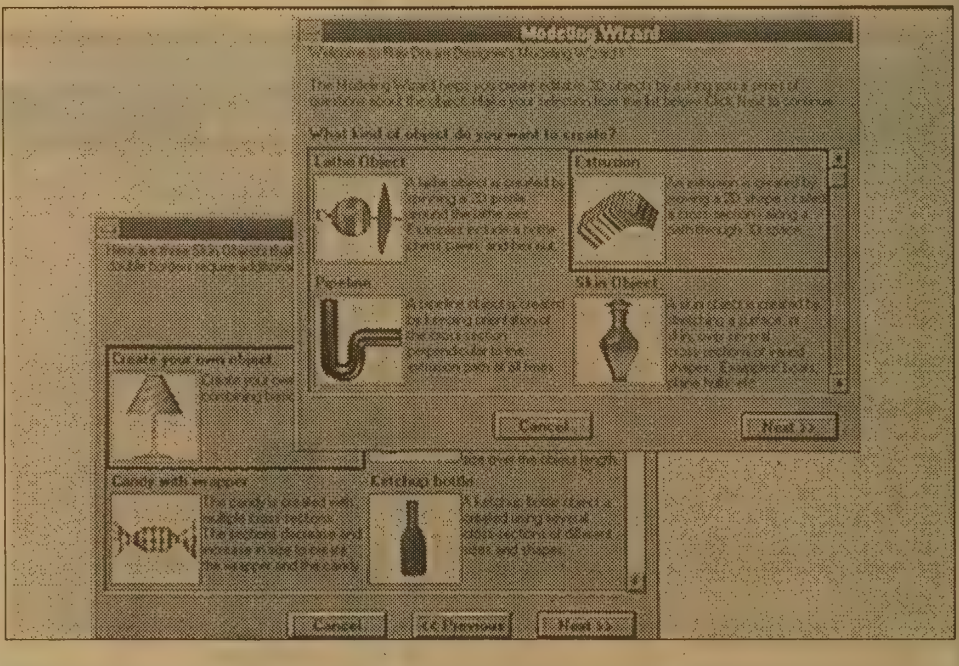
- **Abacus Concepts** announced **StatView 4.1 for Power Mac**, the latest version of its statistical analysis software for Macintosh. Abacus Concepts, Inc., 1918 Bonita Ave., Berkeley, CA 94704. (510)540-1949.
- **Autodesk** released **AutoCAD Designer 1.1**, the newest version of its advanced, parametric, feature-based mechanical design and drafting system for AutoCAD users. It is available for $1500 and free to current AutoCAD Designer users. Autodesk, Inc., 1-800-964-6432.
- **CE Software** shipped **QuickMail 3.0**, a significantly enhanced version of its award-winning email system. Users of older versions can upgrade for from $12 per user, and it is available starting at $199 for one user. CE Software, Inc., 1801 Industrial Circle, West Des Moines, IA 50265. 1-800-523-7638.
- **DataViz** released **v8.0 of its MacLinkPlus** file translation line. Suggested retail prices begin at $109 for MacLinkPlus/Easy Open Translators and upgrades are $39.95. DataViz, Inc., 55 Corporate Dr., Trumbull, CT 06611. 1-800-733-0030.
- **DesignWare** introduced **myHouse for Windows v1.5**, the latest version of its 3-D home design software package. The suggested retail price is $84.95. DesignWare, Inc., 17 Main St., Watertown, MA 02172. (617)924-6712.
- **Easel Corp.** announced **ENFIN 4.1**, the new version of its object-oriented client/server application development environment. Prices start at $3995, depending on options and configuration. Easel Corp., 25 Corporate Dr., Burlington, MA 01803. (617)221-2100.
- **Fractal Design** has released **v3 of Fractal Design Painter for Windows**, its natural-media paint and image-editing program. The new version contains more than fifty new features and is available for $499, $149 for users of versions 1.0, 1.2, and 2.0. Fractal Design Corp., 335 Spreckels Dr., Aptos, CA 95003. (408)688-5300.
- **North Beach Labs** has shipped **v1.5 of DiskDuplicator** (formerly DiskCloner for Windows), its disk duplication utility for Windows. Users of v1.0 can upgrade for $19.95, while the suggested retail price is $59.95. North Beach Labs, 350 Union, #402, San Francisco, CA 94133. (415)693-0570.
- **RAD Technologies** released **v2.2 of ScreenPlay**, its screen video and audio recording, editing, and playback software. The new version provides an Internet publishing license. Users of v2.0 or 2.1 can upgrade for $2195; the price for new users is $4995. RAD Technologies, Inc., 745 Emerson St., Palo Alto, CA 94301. 1-800-773-4RAD, (415)617-9430.
- **Trumatch** released **ColorPrinter Software 4.0 for Macintosh**, which lets Power Mac and System 7.5 users match the colors assigned on their screen to the output from their printer exactly. It is available for $98. Trumatch, Inc., 25 West 43rd St., Suite 817, New York, NY 10036. 1-800-TRU-9100.
- **The Valis Group** announced **PixelPutty Solo 1.2**, its complete 3-D free-form organic modeling application. It is priced at $129. The Valis Group, PO Box 831, Tiburon, CA 94920. 1-800-VALIS-04, (415)435-5404.
- **Xerox** has shipped the **Power Macintosh version of TextBridge 2.0**, its optical character recognition software. Available for $99, current users of v2.0 can upgrade for $49. Xerox Corp., 3400 Hillview Ave., Palo Alto, CA 94304. 1-800-248-6550.

New Products

PC Software

Ray Dream Designer 3 For Windows

Ray Dream Designer 3 is a full-featured 3-D illustration program that enables users to model 3-D objects; apply textures, colors, and shading characteristics to them; arrange them in a scene; create, edit, and position multiple light sources and camera angles; and then render that scene as a high-quality, high-resolution digital image. New features include 3D Paint, which lets users brush color and textures directly onto 3-D objects; Modeling Wizard, which creates 3-D objects automatically; Bézier Modeler, which combines familiar 2-D drawing tools with advanced modeling techniques; Drag & Drop Textures, with over 120 built-in textures; and Ease of Creation, by which Designer automatically handles perspective, shadows, lighting, textures, and reflections. ($349) Ray Dream, Inc., 1804 N. Shoreline Blvd., Mountain View, CA 94043. (415)960-0768, 1-800-846-0111.



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- 1.44MB Floppy Supply
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- PCI S3 SVGA card w/1MB
- 14" Non-interlace SVGA monitor

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Pentium 66 PCI w/SVGA	**$1795**
Pentium 66 VLB w/SVGA	**$1745**
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486 DX2-66 VLB

- AMD 486 DX2-66MHz CPU
- 256K Cache
- 4MB High Speed RAM
- 420MB IDE Hard Disk
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- **Acer** 3 VLB, 4 ISA Slots
- Mini Tower Case w/250W PS
- 1.44MB Floppy
- VLB SVGA w/1MB
- 14" SVGA monitor
- IDE I/O Card

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486DX2-50 VLB system	**$959**
486DX-33 VLB system	**$929**
486DX-40 VLB system	**$939**
486SX-33 VLB system	**$899**
486DLC-40 VLB (Opti)	**$879**
540MB	add **$60**
8MB / 16MB	add **$160 / $395**

Multimedia NOTEBOOK

- **Intel 486 SX-33SL CPU**
- 4MB (8, 16, 20 or 32 optional)
- 32-bit VLB Windows Accelerator Video Card w/1MB support 1024x768 at 256 colors
- 9.5" Monochrome display
- 258MB Hard Disk (344MB / 540MB optional)
- 1.44MB Removable Floppy Drive
- Built-in 25mm Trackball at Center
- Built-in Audio - Sound Blaster Compatible, w/built-in speaker
- Ports: 1S, 1P, 1 Ext. SVGA, 1 Ext. Keyboard
- Power: 4 Hr to 8 Hr with "Double Life" Tech, Auto Switching AC/DC Adaptor 1.5 Hour Fast Battery Charge, Power Saving, Doze, Sleep & Suspend
- MS DOS 6.2

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486 DX-33, 258MB, Dual Scan Color	**$1950**
486 DX2-66, 340MB, Active Color	**$3150**

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486SLC2-66

- IBM 486SLC w/Math-co
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- Enhanced 101-keyboard
- 14" SVGA .28mm Monitor
- 2S/1P/1G I/O Card
- 1.44MB Floppy Drive
- IDE 2HD/2FD Controller
- 2 VLB Slots
- AMI BIOS

$889

420MB Hard Disk	add **$50**
540MB Hard Disk	add **$95**

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2MB upgrade to 4MB	$160
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8MB upgrade to 16MB **w/trade-in**	$396

386 UPGRADE TO 486

	Cyrix	AMD	Intel
486DX-33	$240	n/a	$260
486DX-40	$250	$285	n/a
486DLC-40	$185	n/a	n/a
486DX2-50	$255	$295	$285
486DX2-66	n/a	$305	$335

** Motherboard with CPU upgrade subject to $75 labor charge*

Special

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Double Speed CD-ROM Drive

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SONY 55E CD-ROM w/Sound Blaster 16-bit sound card	**$220**
CD-ROM installation service (Optional)	**$35**

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340MB	$170	540MB	$250
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IDE I/O card / VLB IDE I/O card	$18 / $20
Hard disk installation	$35
Hard disk installation + data transfer	$55

CPU UPGRADE

	Cyrix	AMD	Intel
486DX-25 to 486DX2-50	$145	$165	$180
486DX-25 to 486DX2-66	n/a	$195	$210
486DX-33 to 486DX2-66	n/a	$205 / ***$165**	$210 / ***$180**
486DX2-50 to 486DX2-66	n/a	$205 / ***$155**	$210 / ***$170**

**** with CPU trade-in program***

$25 labor charge for all CPU upgrade

Acer 17" Monitor

Acer 76i	.28mm
On-screen control	1280X1024
Non-interlace	Flat screen

$649

Case

Mini AT w 200W power	65
P100 Super Slim 2 Bay w.130W	74

CD-ROM

backpack

External, 2x speed, Parallel port 250ms, 350kb/s Multisession Photo CD compatible	309

NEC

CDR 510 int 3X sp. 195ms 450 kb/s, SCSI	279

Panasonic Office Automation OA

562 320ms 300 kb/s internal / w.ctrl	125/139

SONY.

55S 2x-speed internal 220ms, 360kb/s	215
55E 2x-speed internal 220ms, **IDE**	125

TOSHIBA

3501B 4x-speed internal,	295

Controllers

adaptec

1542CF 16-bit SCSI-2, 2 FD, 7 Device	179
1542CFK 16-bit SCSI-2 KIT w. drives, cable	235
2842VL 32-bit VLB fast SCSI-2/ w.kit, drives, cable	235/260
2940 32-bit PCI Fast SCSI-2/ w.kit, drives, cable	299

CHICOTEC

IDE I/O ISA 2FD/2HD/2S/1P/1G	15
IDE I/O ISA 2FD/2HD/2S/1P/1G Fast 16550	45
VLB IDE I/O 2FD/2HD/2S/1P/1G	20
VLB IDE I/O 2FD/2HD/2S/1P/1G Fast 16550	55

Motherboard

VLB 486-33/50/66 256k w/o CPU	99
Pentium 90 PCI w/256k w/o CPU (**Intel**)	315

Drives

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420MB	IDE	CFS-420A	14ms	1" X 3.5"	Call
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Maxtor

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345MB	IDE	7345A	14ms	1" X 3.5"	Call
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540MB	IDE	540A	14ms	Call
540MB	SCSI	540S	12ms	Call
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2.1GB	SCSI-2	2100S		Call

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4 x 36 (16MB) / 4 x 32	SIMM	545/Call
8 x 36 (32MB)	SIMM	1050

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USRobotics

Sportster Fax 144 S/R	int/ext	115/125
Sportster 28.8 **V.34**	int/ext	215/235

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Monitor

Impression

3428G/3428NG 14" 1024x768 .28	229/239

Video Card

DIAMOND

SpeedStar Pro ISA or VLB 1MB	99
Stealth 64 VLB or PCI **1/2 MB** DRAM	139/179
Stealth 64 VLB or PCI 2MB VRAM	289
Viper SE PCI 2MB VRAM	299
S3 SVGA VLB 1024x768 1MB	69

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Course Builder Cross Platform

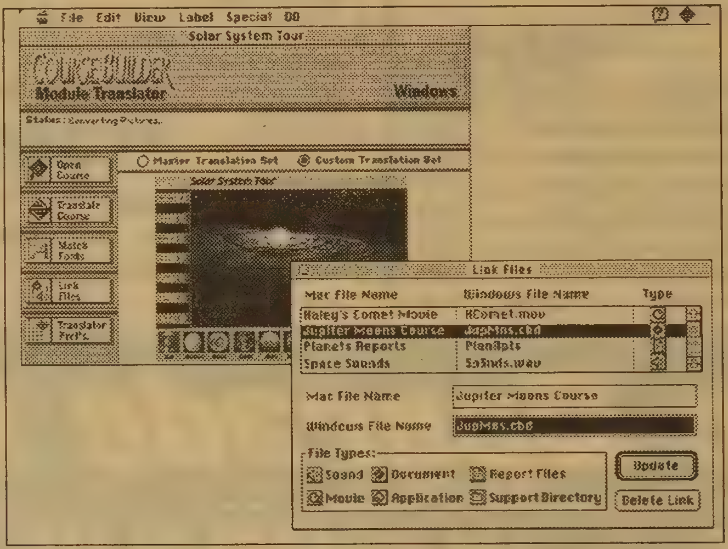
Course Builder is an authoring program for developing interactive, computer-based learning applications. CB Cross Platform provides cross-platform capability so that interactive applications created on the original Course Builder for the Macintosh can be translated for playback on PCs using Windows. It consists of two components: the Module Translator and the Module Players. The Translator, a Macintosh application, prepares Course Builder files for transfer to a PC. It maximizes efficiency for translating multiple modules and minimizes editing of previously developed applications. The Player runs on Intel-based 386 machines (or higher) using Windows 3.1 and enables users to access any translated Course Builder module. ($750, academic pricing available) Discovery Systems International, Inc., 7325 Oak Ridge Hwy., Suite 100, Knoxville, TN 37931. (615)690-8829.

WinSPIRS

WinSPIRS, Windows-based retrieval software, provides enhanced searching power to achieve accurate results. The interface focuses activity on one screen with all the important functions available through menus, buttons, and function keys. It lets you search more than one database with a single query. WinSPIRS's one-screen view of the search terms, search history, and retrieved records enables you to easily see and judge the results. Enhancements to searches can be performed without leaving the primary screen. Some of the enhancements include having the software suggest alternative search terms, limiting the search, editing previous searches, and selecting search terms from the results on-screen. WinSPIRS is available in English, German, Spanish, and French language versions. SilverPlatter Information, Inc., 100 River Ridge Dr., Norwood, MA 02062-5043. 1-800-343-0064.

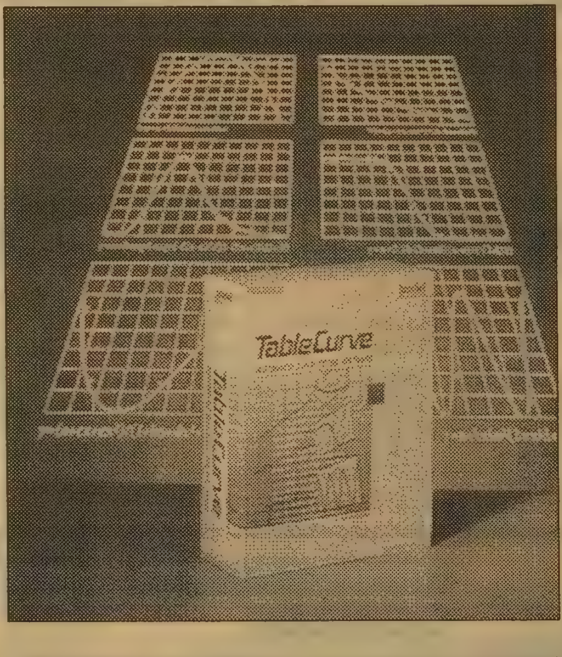
TableCurve 2D

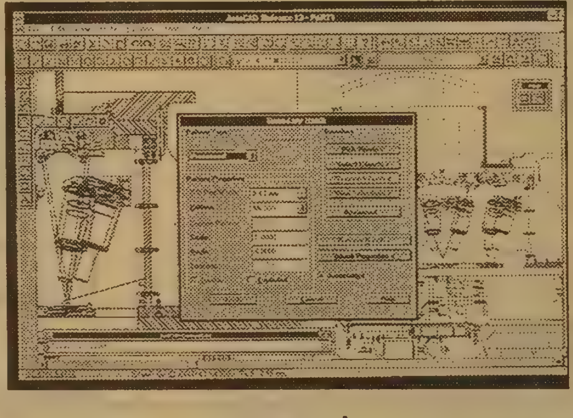
TableCurve 2D for Windows 32-bit v3.0 enables users to discover and review the best fitting equation for their most complex data quickly and effortlessly. In a single, highly automated and rapid processing step, TableCurve 2D selects from the 3456 built-in linear and nonlinear functions to find the best fit equation for an X,Y data set. Equations are ranked according to user-selected best-fit criteria. Once the curve fit process is completed, an equation list and curve fit graph are generated. Version 3.0 includes both new analysis features and an enhanced interface. It also takes advantage of the Windows environment and is a full 32-bit Windows application. For Windows NT users, multitasking is now available. ($495) Jandel Scientific Software, Inc., 2591 Kerner Blvd., San Rafael, CA 94901. (415)453-6700.



Mac File Name	Windows File Name	Type
Haley's Comet Movie	HComet.mov	
Jupiter Moons Course	JupMns.cbd	
Planets Reports	PlanRpts	
Space Sounds	SpSnds.wav	

Mac File Name: Jupiter Moons Course
Windows File Name: JupMns.cbd





AutoCAD Release 13

AutoCAD Release 13 contains new features requested by users from around the world, like more major drafting and design capabilities and a customizable Windows interface. There are also online learning tools, icon toolbars and tool tips, enhanced keyboard use/command line, and drawing preview. Added design and drafting features include ACIS-based solid-modeling capabilities with an AME conversion utility; superior annotation and spell checker; flexible, intuitive dimensioning; associative hatching; complex linetypes with shape or text; new geometry and easier editing; an improved data-sharing model; and faster rendering and visualization, with improved compatibility with 3D Studio. It also supports both Windows OLE client and server. AutoCAD Release 13 is currently available with a multiplatform license for DOS and Windows, and for Windows NT by March 1995. ($3750 on CD-ROM, $3995 on disk) Autodesk, Inc., 2320 Marinship Way, Sausalito, CA 94965. (415)332-2344.

Autodesk WorkCenter

Fully integrated with AutoCAD and combining both technical document management and project workflow tools, Autodesk WorkCenter provides secure document storage and access, and efficient document organization and tracking for mechanical design industries. A standalone, Windows-based product, it allows all design team members to access electronic project information—CAD files, text documents, spreadsheets, database reports, etc. Users can easily organize and access these related documents throughout the design cycle, from initial concept to manufacturing. WorkCenter can flexibly organize your work according to job demands; provide secure, multi-user document storage with check-out/check-in capability; facilitate electronic notification, distribution, and document approval; track project documents and manage revisions over time; provide multiformat viewing and redlining; and integrate fully with AutoCAD for Windows. ($695) Autodesk, Inc., 2320 Marinship Way, Sausalito, CA 94965. (415)332-2344.

DocLink/VB 1.0 For Windows

Napersoft's DocLink/VB 1.0 for Windows is a new VBX custom control that simplifies the linking of applications to Windows-based word processors. It seamlessly integrates new and existing applications to WordPerfect, Microsoft Word, and Lotus Ami Pro, and eliminates the need for programmers to learn multiple word processor architectures and write lengthy code. Instead, only a few simple lines of

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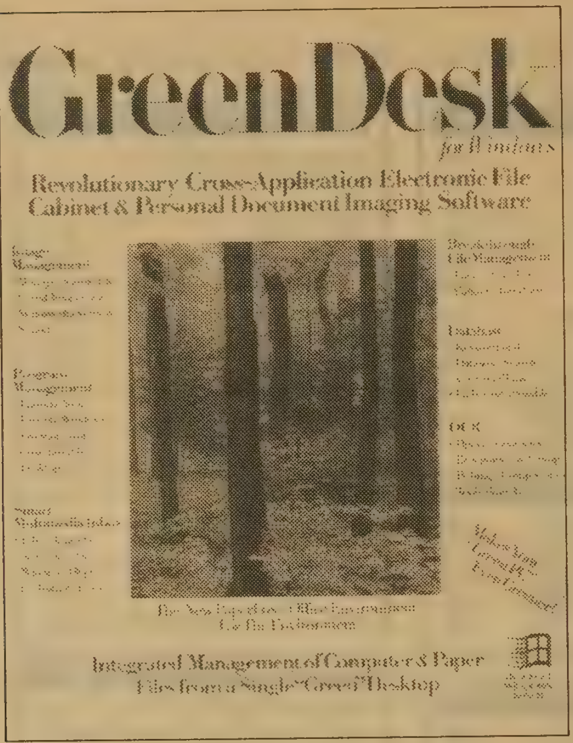
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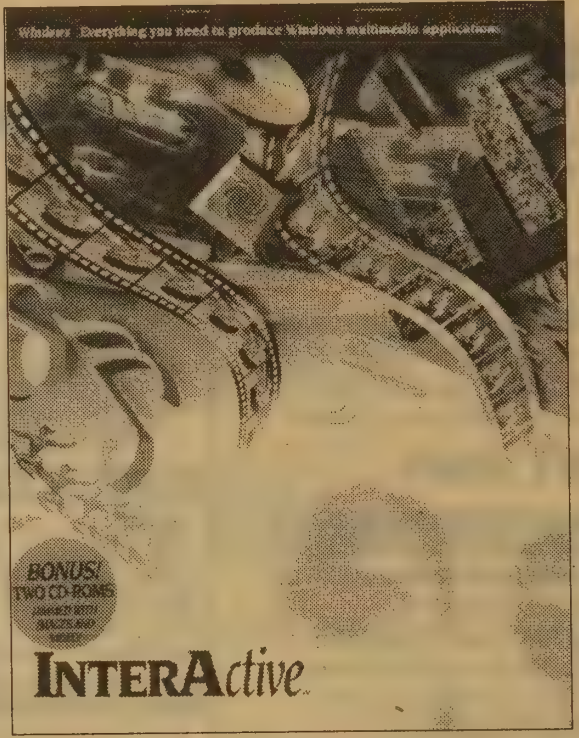
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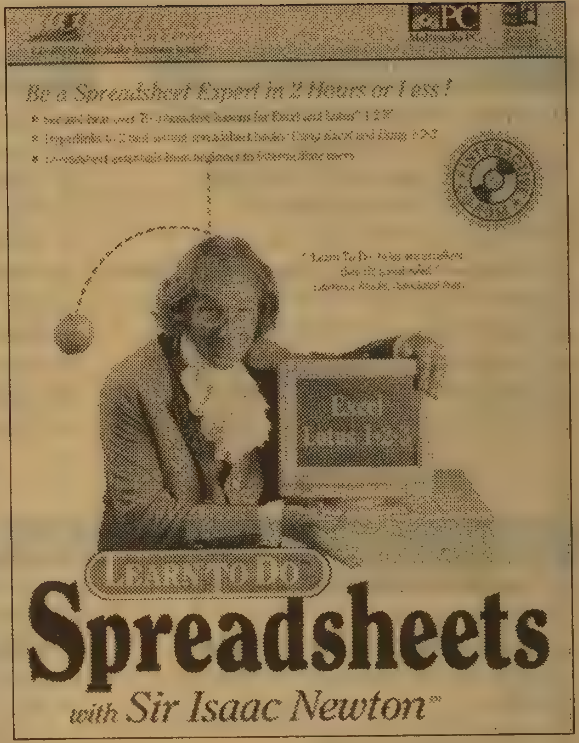

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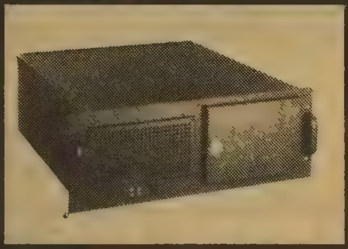

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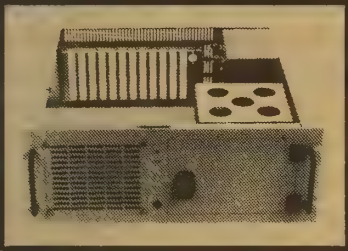

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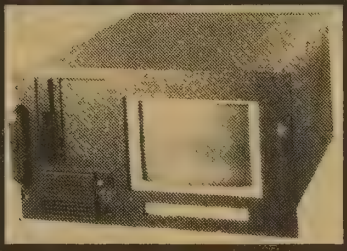

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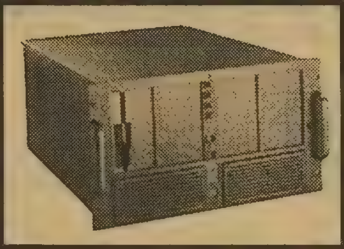

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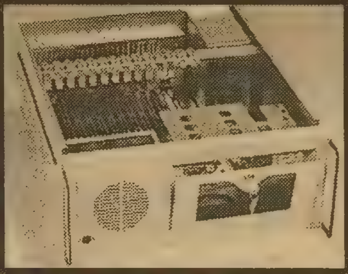

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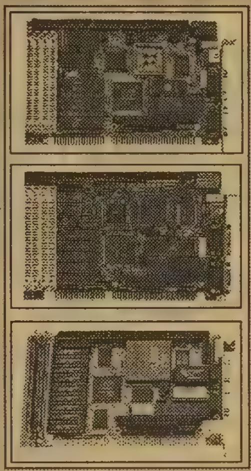

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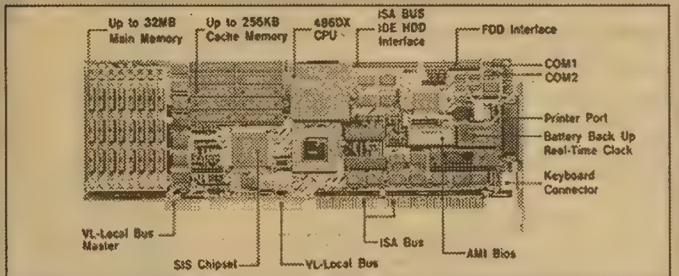

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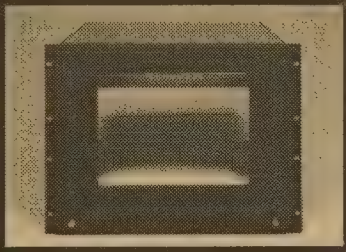

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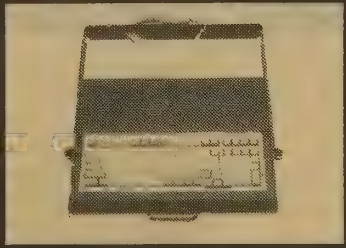

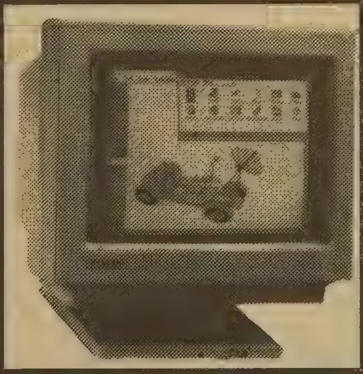

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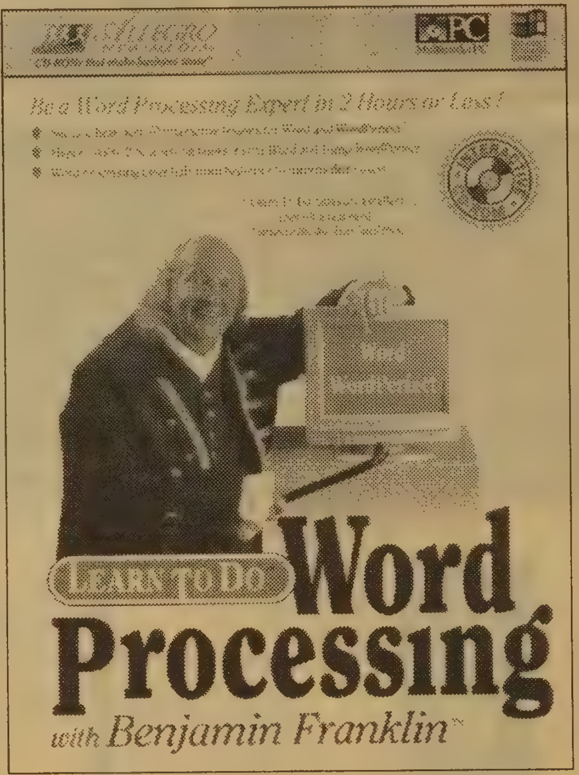
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Macintosh Software

Now Utilities 5.0

Now Utilities 5.0 is a set of nine Macintosh system enhancements which simplify and streamline file access and file management, and automate functions such as conflict isolation and resolution, memory management, and file saving. Version 5 has been accelerated for Power Macintosh and takes advantage of System 7.5. New features include QuickFiler, which provides flexible management of thousands of files wherever they are stored, and FolderMenus that opens menus of files directly from the Finder icon. An improved user interface includes Button Bars, Hot Help, and Super Boomerang. ($89.95, upgrades cost $39.95) Now Software, Inc., 921 S.W. Washington St., Suite 500, Portland, OR 97205-2328. (503)274-2800.

Molecules–3D 2.0 For Macintosh

Molecules–3D, a 3-D molecular model builder, is designed for both students in academia and technical experts in the chemical industries. It enables users to build, examine, modify, and transfer 3-D models and sophisticated 3-D graphic images to (and from) other applications. Version 2.0 offers many new features including an expandable Structure Library of over one hundred 3-D molecular structures of common, scientific, and topical interest; Coach Lewis, to guide you through a process of building accurate 2-D Lewis diagrams; illustrated documentation; customizable molecular parameter settings; one-button wire-frame, ball-and-stick, and spacefill rendering; and streamlined access to other critical features. ($29.95) Molecular Arts Corp., Hanover Corporate Centre, 1532 E. Katella Ave., Suite 1000, Anaheim, CA 92805-6627. (714)634-8100.

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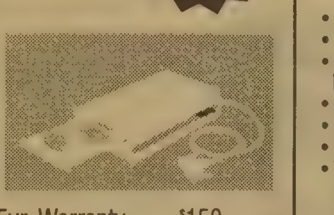

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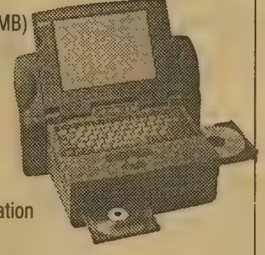

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Dual Scan	**~~$2335~~**	**$1915**
Active Color	**~~$3315~~**	**$2710**

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- Intel 486SX-25 MHz CPU (Upgradable to DX-33, DX2-66, DX4-75/100)
- **8/16K Cache** (Built-in)
- Built-in Audio, **MIC, Speaker, Sound Blaster & Windows compatible**
- **32-bit VESA Local Bus Video & IDE**
- **1MB Video RAM with Win Accelerator**
- **PCMCIA III** or 2 IIs
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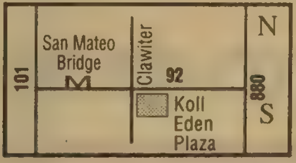

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Reviews

Macintosh Software Review

Adobe Premiere 4.0

Published By: Adobe Systems, Inc.
List Price: $795
Reviewed By: Matthew Leeds

Adobe's latest version of Premiere adds new features, improves old ones, and brings a new level of sophistication to this QuickTime editing standard. Version 4.0 runs in native mode on Power Mac systems, supports SMPTE time code, ships on CD-ROM (with lots of extra goodies), and has much improved editing features.

The CD includes interactive video tutorials on new and commonly used features, try-out versions of other Adobe software, a fully functional copy of the Acrobat Reader, new third-party filters, a collection of stock images, video and

Continued on page 259

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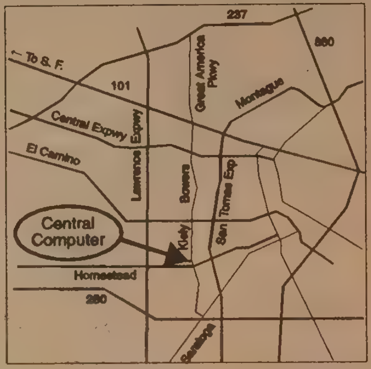

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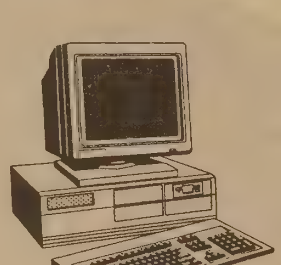

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PROMISE (drive cache)	
DC-4030VL IDE VLB, cache up to 16MB	105
DC-2040 Bios Chips & CD Driver	15
EIDE 2300 Plus IDE/ 4HD/ 2S 1P/ 16550	69
QLOGIC	
Fast SCSI 16 bit (all SCSI CD Rom)	65
Fast SCSI EISA w. Kit	199
Fast SCSI VLB w. Kit	189
Fast SCSI PCMCIA	199
Fast SCSI PCI w. Kit	249
Wide SCSI PCI w. Kit	319
VITEX	
IDE w. I/O (2S 1P) VLB	32
IDE w. 4FD/ 2S 1P/ 16550 chips	45
IDE w. 4FD/ 4S 2P 1G/ 2S16550/ VLB	89
Enhanced IDE/ 4HD/ 2S 1P/ VLB/ 16550	65
WONDER SYSTEM	
IDE w. 4FD/ 2.88/ Drivers Tape/ 1.0 Mbps	35
IFSP2 IDE w. 4FD/ 3S 2P 1G/ 2S16550	69
SCSI w. CD Rom Drivers	39
IDE 2H4FD / 2S 1P / 16550	45
VL2018 IDE w. 2HD/ 4FD/ 16550/ 2.88/ VLB	59
OTHERS	
ACCULOGIC IDE PCI Controller	49
BOCA IDE w. I/O (2S 1P)	49
IDE w. I/O (2S 1P) / IDE w. I/O VLB	19.50/29
SC200 SCSI-2 PCI (w. NCR chips)	85

4. CPU & MATH CO

CPU :	
AMD	
386 DX-40	59
486-DX2-66	189
CYRIX	
486 DX-33	119
INTEL	
386 DX-33 / 40	45/45
486 DX-33	135
486 DX-50	269
486 DX2-50	179
486-DX2-66	209
486 DX4-100	539
Pentium 586-60 / 66 / 90	409/509/639
Math Co Processor :	
CYRIX	
83D87 - 33	39
IIT	
Cx486 DLC TI-40	75
INTEL	
387 DX / 387 SX (for 16/ 20/ 25/ 33 MHz)	85/79
ULSI	
83D87 - 40	39
OTHERS	
Cooling Fan for 486 CPU	7.50
Cooling Fan for Pentium 586	15

*(price) .... special, while supplies last

CENTRAL
COMPUTER SYSTEMS INC.
WIDE SELECTION AT LOW PRICES

FAX : 408 241-0390 TEL : 408 248-5888 / 408 241-0185
Email : CentOn@aol.com 820 Kiely Blvd., Santa Clara CA 95051

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5. DIGITIZER

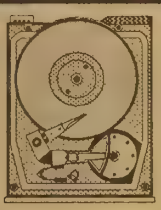
SUMMASKETCH

III 12 x 12, 4 or 16 button	269
III 12 x 18, 4 or 16 button	*(495)549

WACOM

UD-0608R 6 x 8, w. UP-201 Pressure Stylus	345
UD-1212RP 12 x 12, w. UP-201 Pres. Stylus	529
KT-0405R 4 x 5, Art Pad	155
KT-0405R with Fractal Dabler	185

6. DRIVE



FLOPPY DRIVES :

SYQUEST (MITAC, removable)

88MB 3.5" w. cartridge, Int	349
88MB 5.25" w. cartridge for Mac, Ext.	429
105MB 3.5" w. cart., IDE host adapter	279
105MB 3.5" w. cart., printer port for PC, Ext.	369
105MB 5.25" w. cart., SCSI for Mac, Ext.	389
200MB 5.25" w. cart., SCSI Ext	515
270MB 3.5" w. cartridge, IDE, Int	489
270MB 3.5" w. cartridge, SCSI, Ext.	515
270MB 3.5" w. cart., printer port for PC, Ext.	515
105MB Cartridge / 270MB Cartridge	59/69

TEAC

1.2MB 5.25"	46
1.44MB 3.5" / w. frame	36/40
Dual - 1.2MB & 1.44MB	89

HARD DRIVES :

CONNER

CFS-420A 420MB 14ms IDE 1" ht	179
CFS-540A 540MB 14ms 32k IDE 1" ht	219
CFA-850A 850MB 12ms 256k IDE 1" ht	299
CFP-1060S 1.06GB 10ms 256k SCSI	499
CFP-1060W 1.06GB Wide-SCSI	635
CFA-1275A 1.2GB 12ms 256k IDE 1"ht.	469
CFP-2120S 2.1GB 10ms 1/2 ht	1095

FUJITSU (5 yr. warranty fr. Fujitsu)

M2684TAU 540MB 12ms IDE 1" ht	225
M2684SAU 540MB 12ms SCSI 1" ht	259
M2694ESA 1.0GB 10ms SCSI-2 3.5" 1/2 ht	559
M2694EQA 1.0GB 10ms Wide-SCSI	649

MAXTOR

MXT-7135A 135MB 15ms IDE 3.5"	139
MXT-7345S 345MB 15ms SCSI 1" ht	189
MXT-7540A 540MB 14ms 64k IDE	215
MXT-7546A 546MB 12ms 256k IDE	229
Optical Rewritable 1.3GB 19ms SCSI, 4MB Ext.	
Tahiti III MXO-9410000 Drive only	2175
1GB Glass Cart. MXO-2015382 512k sector	165
1GB Glass Cart. MXO-2015384 1024k sector	165
1GB Plastic Cart. MXO-2015383 512k sector	135
1GB Plastic Cart. MXO-2015385 1024k sector	135

MICROPOLIS

MC-2217A 1.75GB 10ms 512k IDE 1/2 ht	925
MC-2217 1.75GB 10ms 512k SCSI-2 1/2 ht	925
MC-2217AV 1.75GB Audio Visual	1045
MC-2217DW 1.75GB Fast Wide-SCSI	1285
MC-1926 2.1GB 13ms 512k SCSI-2 full ht	1295
MC-1936 3.0GB 11ms 256k SCSI full ht	1535
MC-1936AV 3.0GB Audio Visual	1885

QUANTUM

LPS-270AT 270MB 12ms 128k IDE	179
MV-540A 540MB 14ms 128k IDE	215
MV-540S 540MB 14ms 128k SCSI	239
LT-540A 540MB 11ms 128k IDE	239
LT-540S 540MB 11ms 128k SCSI-2	259
EM-1080S 1.08GB 9.5ms SCSI-2	559
EM-2100S 2.1GB SCSI-2	925

SEAGATE

ST3491 420MB 14ms 128k IDE	189
ST-3660 540MB 14ms 64k IDE 1"ht.	239
ST-31200N 1.05GB 9ms 256k SCSI-2	559
ST-31220A 1.08GB 12ms 256k IDE.	499
ST-12550N 2.14GB 8ms 1M SCSI-2	1175
ST-12550W 2.14GB Fast-wide SCSI	1299
ST-43400N 2.9GB 10ms 512k SCSI-2	1895
ST-15230N 4.3GB 9ms 512k SCSI	1985
ST-41080N 9.0GB 11.5ms 1M SCSI	3885

WESTERN DIGITAL (3 yr. warranty)

WD-2340 340MB 12ms IDE	179
WD-2420 420MB 13ms IDE	189
WD-2540 540MB 12ms IDE	239
WD-31000 1.0GB 10ms IDE	439

OTHERS

Impression CardDrive (2 slot PCMCIA)	185
Mounting Frame for 3.5" Hard / Floppy Drive	5/5
Removable Case for 3.5" HD IDE / SCSI	39/42

7. I/O CARD

KOUWELL

AT I/O (2S 1P) / AT I/O (2S 2P)	25/29
AT I/O (2S 1P 1G)	25
AT I/O (2S 1P 1G) w. 16550 chips	42
Printer Card	15
Serial Card (XT, AT)	15

QUICKPATH

13 Port I/O w. 4-16550UARTs + Extd. IRQs (2IDE, 4F, 4S, 2P, 1G)	125
4 Serial, 16550UARTs, 8addr, 10IRQs (3,4,5,7,9,10,11,12,14,15)	99

SIIG (5 yr. warranty)

(2S 1P) w. 16550 chips	45

STB 4-COM

4 Serial, 16 bit, 16550, support Com 1-8, IRQ (2,3,4,5,10,11,12,15)	109

VITEX

AT I/O (2S 2P) w. 16550 chips	45

8. KEYBOARD

FOCUS

FK2001 101 Click	42
FK9000 129 Key Programmable	53

MICROSOFT

Natural Keyboard	98

NORTHGATE OMNI

101NI	*(65)69
102	*(65)69
Ultra T	*(89)95

SIIG (5 yr. warranty)

Suntouch Jr. 84 Key Mini	45
Supertouch 101 Click	53
Wavetouch 101 Soft	39

OTHERS

ANCER 101 Key (black)	42
BTC 84 Key Mini	35
Keytronic 101	35
Maxi 101 / Maxi 124	35/53
Mitsumi 101	29
Spill -resistant 101 Key	19.50
Unikey Natural Ergonomic Keyboard	49

9. MEMORY

DRAM

1MB x 1 - 80ns	6.20
256k x 4 - 80ns	5.50

SIMM

1 x 9 - 60ns / 70ns / 80ns	(1MB)	41/40/39
4 x 9 - 60ns / 70ns	(4MB)	152/149
16 x 9 - 70ns	(16MB)	709
256k x 9 - 70ns / 80ns		14/13
1 x 36 - 60ns / 70ns	(4MB , 72 pin)	175/165
2 x 36 - 60ns / 70ns	(8MB , 72 pin)	340/330
4 x 36 - 60ns / 70ns	(16MB, 72 pin)	569/559
8 x 36 - 60ns	(32MB, 72 pin)	1099
For Mac : 4MB x 8 - 70ns / 80ns		159/155

SIPP

1MB x 9 - 70ns (3 chips)	42

COMPUTER MEMORY (3rd party)

for Compaq, IBM available
for details and prices .... call Norman

KINGSTON MEMORY

current price .... call

LAPTOP / NOTEBOOK (3rd party)

for AST, Compaq, IBM, Macintosh, NEC
Packard Bell, Panasonic, Toshiba
for details and prices .... call Norman

LASER PRINTER MEM. UPGRADE

JET RAM (3rd party)
for Epson , HP, Panasonic, QMS, Texas Ins.
for derails and prices .... call Norman
PACIFIC DATA
for HP, Pro Tracer
details and prices .... call Norman

10. MODEM & FAX

BOCA

14.4 Fax Data Voice Int	155
14.4 Fax Int / Ext	*(89)/125
14.4 Pocket Fax	169
28.8 Fax 14.4 Modem Int / Ext	*(159/189)
28.8 Fax Modem v.34 Int / Ext	195/229

GVC

14.4 Fax Int / Ext	99/119
PCMCIA 9624 Fax	99

HAYES

Accura 144 + Fax Int / Ext	*(99/129)
Accura 28.8 Fax 14.4 Modem Ext	235
ESP Communication : Single / Dual port.	85/125
Optima 288 V.Fast 144 Fax Int / Ext	359/415
Optima 288 v.34 Ext	445
PCMCIA Optima 144 Fax	*(199)

INTEL

Faxability Plus/OCR 2.0 for Windows	*(75)
PCMCIA 144 International Fax	*(379)
SatisFAXtion w. Faxability Software - 400 144/144 Int / 400e 96/144 Ext	269/325

MEGAHERTZ

PCMCIA XJ1144 Fax (MNP5)	*(199)
PCMCIA XJ2144 Fax (MNP10)	*(245)

MICROCOM

Deskporte ES 28.8 Fast 14.4 Fax Ext	189
Deskporte EP 28.8 Fast 14.4 Fax Ext	*(249)
Microporte 4232bis Fax	465

PRACTICAL PERIPHERALS

Fax Me (turn HP laser to fax receiving)	*(59)
Mini Tower 144FX144 Ext	135
PM144FX144 Int	115
288 Fax 144 Ext (PC 288 LCD)	349
288 Fax v.34 Int / Ext	209/225

SHIVA

Net modem/E Ethernet BNC/TP	1475

US ROBOTICS

Courier v32 Terbo Fax 19.2MB w. ASL Int	359
Courier v32 Terbo Fax 19.2MB w. ASL Ext	379
Sportster 144/144 Fax MNP5 Int / Ext	99/119
Sportster 144/144 for Mac Ext	149
Sportster 28.8/14.4 Fax Int	165
Sportster V.34 28.8/14.4 Fax Int / Ext.	205/219
Sportster V.34 28.8/14.4 Fax for MAC	259
Sportster PCMCIA 144 Fax	195

ZOOM (7yr. Warranty fr. Zoom)

96/96 w. WinFax Lite Int / Ext	99/125
144/144 w. WinFax Lite Int / Ext	119/145
144/144 Fax Modem & Voice Int / Ext	139/169
28.8 V.Fast 14.4 Fax Int / Ext	139/189

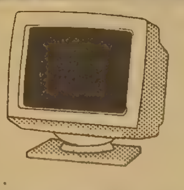
ZY-XEL

U1496B 16.8 Voice 14.4 Fax w. Software Int	289
U1496B+ upgradable to 19.2Kbps Int	397
U1496E 16.8 Voice 14.4 Fax, LED Ext	299
U1496E+ upgradable to 19.2Kbps Ext	399

OTHERS

CommShare 550 Phone & Fax Auto-switch	75
CommShare 750 4 Port Switching	99
National Semiconductor TyIN 2000 Int	*(75)
SIIG TeleCommunicator 10-in-1 Fax	219
14.4 Fax modem Int	59

11. MONITOR



EYE Q

SM1411 14" Flat Mono Amber Paper White	85
M447AU 14" 1024 x 768 .28 NI	249

HITACHI

CM1586MU 15" Flat 1280 x 1024 .28 NI	369
CM1797M 17" Flat 1600 x 1200 66Hz .26 NI	975
NS1764 17" Flat 1280 x 1024 60Hz .26 NI	715

IDEK

MF-8115 15" 1280 x 1024 .28	415
MF-8617 17" 1280 x 1024 .26	799
MF-8621 21" 1600 x 1200 .26	2235
MT-9121 21" 1600 x 1200 .30	1895

KFC

CT1428A 14" 1024 x 768 .28 NI	249
CA1507 15" Flat 1280 x 1024 .28 NI LED.	375
CA1508 15" Flat 1280 x 1024 .28 NI LCD	389
CA1718 17" Flat 1280 x 1024 .26	745

MAG (auto switch power)

DX15F 15" 1280 x 1024 .28 NI (no LED)	369
DX17F 17" 1280 x 1024 .26 NI (no LED)	669
MX15F 15" MPRII Flat 1280 x 1024 .28 NI	449
MX17F 17" Flat 1280 x 1024 .26 NI	899

MITAC (3 yr. warranty)

M1564 15" 1280 x 1024 .28 NI	325
M1775 17" 1280 x 1024 .28 NI	629

NANAO

F340iW 15" Flat 1024 x 768 .28 NI	625
F550iW 17" 1280 x 1024 .28 NI	*(869)979
F560iW 17" 1280 x 1024 .26 NI	1185
T560i 17" 1280 x 1024 .25 NI	1385
T660i 20" 1280 x 1024 .31 Trinitron NI	1965
F760iW 21" 1280 x 1024 .31 NI	1895
F780iW 21" 1600 x 1280 .26 NI	2995
T2.17 17" 1280 x 1024 .25 NI	1285
T2.20 20" 1280 x 1024 .31 NI	1965

NEC

2V 14" 1024 x 768 .28	329
3FGe 15" 1024 x 768 .28 NI	*(489)
4FGe 15" Flat 1024 x 768 .28 NI	*(615)625
XP15 15" 1024 x 768 .28 NI	655
XE17 17" 1024 x 768 .28 NI	985
XP17 17" 1280 x 1024 .28 NI	1249
6FGp 21" 1280 x 1024 NI	1995
XP21 21" 1600 x 1200 .28 NI	2449
Monitor Lens : 4FG / 5FG / 6FG	75/*(99)/185

NOKIA

449E 15" 1280 x 1024 .28 NI	*(425)499
447L 17" 1024 x 768 .28 NI	749
447X 17" 1600 x 1280 .25 NI	1059
445X 21" 1600 x 1280 .26 TCO	2485

OPTIQUEST

1000S 14" 1024 x 768 .28 NI	249
1500D 14" 1280 x 1024 .28 NI	349
2000DC 15" 1280 x 1024 .27 NI	399
4000DS 17" 1280 x 1024 .27 NI	679
4000TC 17" 1280 x 1024 .25 Trinitron NI	799

PANASONIC

C1791E 17" 1280 x 1024 .28 NI	*(699)749

PROTON

GM1449A 14" 1024 x 768 .28 NI	245
GM1563 15" 1280 x 1024 .28 NI	345
GM1563B 15" 1280 x 1024 Black	359
PM1561A 15" 1280 x 1024 w. speakers built-in	345

SIIG

9" VGA Mono Paper White 640 x 480	135

SONY

15SF 15" 1280 x 1024 .25 NI	439
17SE 17" 1600 x 1280 .25 NI w. After Dark	989
17SF 17" 1280 x 1024 .25	869
1730 17" 1024 x 768 .25 NI	839
20SE 20" 1280 x 1024 .30 NI	1835

STANDARD TECHNOLOGIES

428-VESA 14" 1280 x 1024 .28 NI	249

VIEWSONIC

6e 14" 1024 x 768 .28 NI	275
15 15" Flat 1280 x 1024 .28 NI	409
15ES 15" 1024 x 768 .28 NI, MacII	335
17 17" 1600 x 1280 .27 NI, MacII	849
17G 17" 1280 x 1024 .28 NI	749
20 20" 1600 x 1280 .28 NI, MacII	1479
21PS 21" 1600 x 1280 .26 NI, MacII	1669

12. MOTHERBOARD

AIR (w/o cpu)

486-DX2-66 256k, 3VLB slots, built-in AT I/O.	189
486-33 / DX2-66 256k, EISA, 3VLB slots	349
586-90 256k, EISA, Adaptec SCSI, Floppy, w. I/O built-in	659
586-90 256k, EISA, Adaptec SCSI, Floppy, dual processor, w. I/O built-in	769
586-90 256k, ISA PCI VLB, w. I/O built-in	379

AMI (w/o cpu)

Super Voyager III 486-DX2-66 VLB, 7 slots	399
Enterprise IV 486-DX2-66 256k EISA VLB	465
586-90MHz PCI 256k w. IDE I/O	489

ASUS (w/o cpu)

486-DX2-66 256k VLB	139
486-DX2-66 256k PCI, built-in IDE+SCSI I/O.	275
586-90 / 100 256k PCI EISA, dual processor.	779

IBM (OPAL)

486SLC-66 VLB w. CPU & Math Proc	175

INTEL (w/o cpu)

586-90MHz 256k PCI, built-in IDE I/O	359

LYNX (USA made, w/o cpu)

486-33 / DX2-66 256k VLB Green PC	135

MICRONICS (w/o cpu)

BCP 386-33 64k, 4MB max	79
486-33 / DX2-66 256k VLB	179
JX30G 486-DX2-66 256k VLB w. Zif socket	239
486 - 33 / DX2-66 256k EISA VLB	425
586-60 256k, ISA PCI, 3PCI slots	415
M5PE 586-60 / 66 256k EISA	595
M54PI 586-90 w. IDE I/O (Neptune)	445

NICE (w/o cpu)

486-33 / DX2-66 256k VLB, Green PC	139
486-50 / DX2-66 256k EISA VLB	315

SHUTTLE (w/o cpu)

486-DX2-66 256k 3VLB slots, Green PC	125
486-DX2-66 256k EISA 3VLB slots	239

SUPER P54VL-PCI (w/o cpu)

Pentium P54VL-PCI 586-90 256k Flash Bios.	329

TIGER V

586-90MHz 256k PCI	329

13. MOUSE & JOYSTICK

AGILER

AGM-800E Serial 400 dpi	12.50
ATB-610 Serial Trackball	21.50
Master Plus 400	16.50

ANCER (black)

3-button	19

KENSINGTON

Expert Bus 4.0	119
Expert Serial & Trackball 4.0	99

(price) .... special, while supplies last

LOGITECH

Cordless II	85
Cyberman 3D Controller	*(49)
First Serial	31
Fotoman Plus Camera for PC & PS/2	549
Mouseman Bus	64
Mouseman Serial	45
PG15 Bus oem	45
Trackman II	75
Trackman Portable	49

MICROSOFT (USA made)

Bus 2.0 400dpi oem / w. Bus Card	43/65
Bus 2.0 w. Expansion Card	79
Home Serial 1.0	39.95
PS/2 2.0 (round connector)	59
PS/2 & Serial Mouse 400dpi oem	45
Serial 2.0 400dpi oem : gray / white	29/35

MOUSE SYSTEMS

Altes Mouse	9.95
Cobra (joystick)	9.95
Mouse! Serial w. Pad	19
PC Mouse (3-button optical)	39.50
PC Trackball II	45
Serial Bus Card (9IRQs)	29
The New Mouse 400dpi (3-button)	39

JOYSTICK :

THRUSTMASTER

ACM Gamecard	29.95
F-16 FLCS	135
Flight Control System MK II	75
Flight Control System Pro	119
Flight Stand Holder	19
Formula T1 / w. Indy Car	129/149
Rudder Control	118
Weapon Control MKII	109
UPROM	29.95

OTHERS

Analog Plus (by Sun Comm)	*(19.99)
Analog Pro (by Advanced Gravis)	29
Dexxa Serial Mouse	19.50
PC Gamepad (by Advanced Gravis)	19.95
Quickshot Smart Game Card	16.50
Star Trek Mouse Pad	7.99

14. NETWORK

3COM

3C503 Etherlink II 16 bit coax / TP	165/175
3C509 Etherlink III coax oem / reg	95/118
- 5 Pack oem / reg	479/529
3C509 Etherlink III TP oem / reg	89/115
- 5 Pack oem / reg	445/499
3C509 Etherlink III Combo oem / reg	105/129
- 5 Pack oem / reg	525/559
3C509 TPO oem single / 5 pack	85/449
3C529 Etherlink III for MCA coax / TP	235/239
3C579 Etherlink III EISA coax / TP	228/229
3C589 PCMCIA TP	199
3C589 PCMCIA Combo	249
3C16170 Link Builder (12TP)	359
3C16270 Link Builder (12TP + AUI)	345
3C16060 Link Builder FMSII Bridge	529
3C16670 Link Builder FMSII 12 Port	599
3C16671 Link Builder FMSII 24 Port	995
Transcend Link Builder FMS Management	350

ADDTRON

AE-200LC BNC & TP	52
HUB: UTP8/L (8TP +BNC + AUI)	149
HUB: UTP16/L (16TP + BNC + AUI)	299
HUB: UTP16 (16TP+BNC+AUI) RackMount.	399
Pocket Adapter BNC	115
Transceivers: ET10TB (TP<->AUI)	37
Transceivers: ET10CB (BNC<->AUI)	37

ALLIED TELESIS (CentreCOM)

AT-1500T	*(69)
AT-1700T TP	79
Transceivers: MX10 (AUI - BNC)	39
Transceivers: 210T (AUI - TP)	39

ARTISOFT (Lantastic)

Articom	*(99)
Central Station II	399
Corstream Server 5-user (8340)	*(499)
Lantastic Z (2 stations)	89
Lantastic 6.0 Starter Kit coax 2-user	*(235)
Lantastic 6.0 Add On NR-SI 2000C	*(115) ea.
- or ** Buy 2 Get 1 Free ** or ** 3 for $230 **	
Lantastic 6.0 Add On NR-SI 2000T	125
Lantastic 6.0 Software single user	79
- 6.0 for 5-user / 10-user	339/599
- upgrade for single	39
- upgrade for 5-user	*(99)
Lantastic for OS/2	99
Lantastic for TCP/IP single / 5-user	199/785
NR2000C BNC only (Lantastic 5.0)	167
NR-SI 2000C coax / 5 pk / 10 pk	79/375/685
NR-SI 2000T TP / 5 pk / 10 pk	84/379/689
Remote Boot ROM for NR2000	45

ASANTE (for Mac & PC)

AH1012 Intelligent HUB 12 Port	875
10T HUB 8 Port	199
10T HUB 12 Port (12TP + 1BNC + 1AUI)	495
FriendlyNet with AUI / BNC /TP	69

BOCA

HUB: 8 Port TP only	149
HUB: 16 Port TP only	269
LAN Card : ISA TP / ISA Combo	59/69
LAN Card VLB TP	75
PCI 32 bit Ethernet Combo	89
PCMCIA 10BT Ethernet	169

CASTELLE

JetPress (network Print server) for HP II. IID, III, IIID, coax + TP	429
LANPress (print server connects up to 4 printers)	
- Ethernet Thick/Thin coax (1P 3S)	475
- Ethernet 10BaseT (1P 3S)	475
- Ethernet BNC & 10BaseT (2S 2P)	435

CeLAN

Flex HUB Intelligent SNMP 16 Port	865
Repeater : coax 2 port	225

COGENT

EM525 Ethernet 16 coax / TP	118/119
EM525 Ethernet 16 Combo	135
EM595TP Ethernet PCMCIA UTP	199
EM932 EISA 32 bit coax / TP	238/239
EM960 32 PCI Full Duplex TP / Combo	135/159
EM964TP 32 PCI 4-Port Full Duplex TP	495

DCA

Crosstalk 2.1 for Windows	109
Communicator	58
IRMA Workstation 2.1 Dos / for Win	259/359
IRMA 3270 for MacII/ LC/ SE	735

DIGIBOARD

network products	call

FARALLON

PN381 PhoneNet w. Timbuktu for Win	259
- Timbuktu 1.1 for Win software only	139

IBM

Ether 16 coax / TP	69/69
Ether 16 Combo	79

INTEL

EtherExpress 16 Flash Combo	135
EtherExpress 32 EISA coax (FS)	439
EtherExpress 32 Flash EISA Combo (WS)	229
EtherExpress PRO/100 PILA 8465 PCI TP	219
EtherExpress Pro 8/16 bit cards :	
- PCLA 8200 BNC + AUI + TP	129
- PCLA 8200 5 pack	559
- PCLA 8210 BNC + TP / 5 pk	115/499
- PCLA 8220 TP / 5 pk	109/469
- PCLA 8205 Flash BNC+AUI+TP	139
- PCLA 8205 5 pack	599
- PCLA 8215 Flash BNC + TP / 5 pk	125/549
- PCLA 8225 Flash TP / 5 pk	119/509
LAN Project 1.5 (virus protection)	685
LAN Sight Support 4.0	345
LAN Spool s/w 386 NLM v3.5A	425
Netport II Thin & Thick	395
Netport II 10BT	399
Netport Express XL	465
NetSatisfaxtion 2.5 for Novell	955

LANPRO

2000JC 16 bit BNC only	39
2000JT 16 bit TP	*(29)39
2000JA 16 bit Combo	45
EP3010A Pocket Combo	115
HUB ER5390: 8 Port (9TP + 1BNC)	155
HUB ER5396: 16 Port (17TP + 2BNC + 2AUI)	295
Lan Card : PCI Combo / VLB	95/85
Personal Netware coax 1 user Kit	79
Personal Netware coax Starter Kit	139

MICRODYNE

Eagle NE200 PCMCIA coax / TP	235/199
Eagle NE3210 EISA 32 bit Combo	199
Eagle HUB: 8 Port TP (8TP + 1BNC)	185
Eagle HUB: 12 Port TP (12TP + 1BNC)	225
NE2000+ coax / 5 pack	*(75/349)
NE2000+ TP / 5 pack	*(69/319)
NE2000+ Combo / 5 pack	*(85/389)
NE3200 EISA coax / TP	450/450

NATIONAL SEMICONDUCTOR

InfoMover NE2000+ coax	*(75)85
- 5 pack	339
InfoMover NE2000+ TP	*(69)79
- 5 pack	299
InfoMover NE2000+ Combo	*(89)99
- 5 pack	415
InfoMover NE4100 PCMCIA coax	175
InfoMover NE4100 PCMCIA TP	179

NOVELL

Dos 7 (w. Personal Netware) oem / reg	45/55
Lan Workplace 4.2 single / 10-user	275/1295
Netware 3.12	
- 5 / 10 / 25-user oem	525/1155/1825
- 5 / 10 / 25-user reg	595/1345/1995
Netware 4.1 *(NEW)*	
- 5 / 10 / 25-user oem	560/1195/1895
- 5 / 10 / 25-user reg	615/1395/2075
- 50 / 100 / 250-user	2695/3895/6995
Netware Management Agents	335
Netware NFS v1.2C	3150
NFS Client for Lan Workplace	205
Personal Netware oem / reg	39/75
Unixware Personal Edition - CD version	175
Unixware SDK v1.1 - CD version	75
Unixware NFS	135

SMC

8013 Plus Elite 16 coax / 6 pack	118/625
8013 Plus Elite 16 TP / 6 pack	119/599
8013 Plus Elite 16 Combo / 6 pack	139/775
8013 Plus/A for MCA / for TP	*(175)/199
Elite Ultra 16 coax oem / reg	85/109
- 6 pack	*(489)
Elite Ultra 16 TP oem / reg	79/108
- 6 pack	*(455)
Elite Ultra 16 Combo oem / reg	95/119
- 6 pack	*(549)
Elite Ultra 32 EISA Combo	215
Ether EZ coax / TP	115/*(99)
Ether EZ Combo	125
Etherpower PCI : TP / Combo	185/199
Netware Boot ROM for Ethernet	34
Tiger HUB: 3206TA 6 Port	185
Tiger HUB: 3212TC (12TP + BNC + AUI)	369

SYNOPTICS

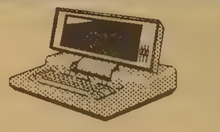
Network Products	call

XIRCOM

PCMCIA CE-10B2 coax	*(235)
PCMCIA CE-10BT TP	*(229)
PCMCIA CE-10BC Combo	*(275)
PE3-10B2 Pocket Adapter coax	*(255)285
PE3-10BT Pocket Adapter TP	*(259)289
PE-3 10BC Pocket Adapter Combo	*(295)325

CABLES & ACCESSORIES . . . . call

15. NOTEBOOK



TOSHIBA

T1960CS 486-DX2-50, 4MB RAM, 200MB HD, 1.44BM FD, Dual Scan Color	2275
T1960CT 486-DX2-50, 4MB RAM, 200MB HD, 1.44MB FD, Active Color	2795
T1960CT 486-DX2-50, 4MB RAM, 320MB HD, 1.44MB FD, Active Color	3029
T3600CT 486-DX2-50 8MB RAM, 250MB HD, 1.44MB FD, Acitve Color	3699
T4700CT 486-DX2-50, 8MB RAM, 200MB HD, 1.44MB FD, Active Color	4399
T4700CT 486-DX2-50, 8MB RAM, 320MB HD, 1.44MB FD, Active Color	4629

OTHERS

ACC9400 9.5/10.4" Viewable Screen size, 128k, 4MB (expandable to 36), VLB w.1MB video ram, removable HD, built-in speaker & microphone :

- 486-33, 250MB(DSTN)	1945
- 486-33, 250MB (TFT)	2755
- 486-DX2-66, 250MB (DSTN)	1995
- 486-DX2-66, 250MB (TFT)	2799
- 486-DX4-100, 250MB (DSTN)	2255
- 486-DX4-100, 250MB (TFT)	2999

16. POWER SUPPLY

AMERICAN POWER CONVERSION

APC-400 Smart-UPS (286, 386 WS)	289
APC-600 Smart-UPS (386, 486 FS)	359
APC-900 Smart-UPS (386, 486, FS & WS)	515
APC-1250 Smart-UPS (multiple FS & WS)	639
APC-2000-2 Smart-UPS	1150
APC-400 Back-UPS (300W)	175
APC-450 Back-UPS (325W)	209
APC-600 Back-UPS (425W)	285
APC-900 Back-UPS (650W)	375
APC PowerChute Plus :	
- for Novell	65
- for OS/2, Lan Server, 3 Com	75
- for Unix / Xenix	99
- for Windows NT	69

PC POWER COOLING

Standard 220	
- for Desktop / Full Tower	85/85
Silencer 270	
- for Slim (baby or mid tower)	135
- for AT Desktop	165
- for Full Tower	159
Turbo Cool 300	
- for Slim (baby or mid tower)	139
- for Desktop	175
- for Full Tower	169
Turbo Cool 450	
- for Desktop	325
- for Full Tower	315
Twinpower 900 (redundant)	925

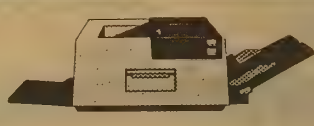
TRIPP LITE

Isobar 4	*(29.95)
Isobar 6 w. Fax Modem Protection	*(45)
Isobar Master Touch Plus w. RJ11	*(59)75
Isotel 4 w. RJ11	*(39.95)

OTHERS

250W for Baby AT	45
250W for Baby or Mid Tower	45
250W for AT / for Full Tower	47/49
300W for Full Tower	69
550W for UPS	279
1200W for UPS	659

17. PRINTER / PLOTTER



BROTHER

HJ-400 Desktop Ink Jet for PC or Mac	*(249)259
HI-630 Laser 6ppm	399
HL-641 6ppm, 1MB RAM	449
HL655M for PC & MAC, 2MB RAM	599

CANON

BJ-200E Ink Jet	229
BJC-600 Ink Jet Par. 360dpi	535

CITIZEN

GSX-145 24 pin, 132 column	355
GSX-220 24 pin	179
GSX-230 Fonts & Quiet	219
GSX-240 Scalable Fonts & Quiet	285
Projet II Ink Jet	279
Accessories :	
- Color Option for GSX-130	45
- Color Option for GSX-145	65

DEC (Digital Equipment)

Printers	call

EPSON

Stylus Color Inkjet 720dpi	*(529)

HP (Hewlett Packard w. toner)

Color Laser Jet	5495
Desk Jet 540	289
Desk Jet 560C	*(469)529
Desk Jet 1200C PC, Mac	1065
Desk Jet 1200C Postscript PC, Mac	1625
Laser Jet 4+ / 4M+	1389/1899
Laser Jet 4L / w. Rebate	619/519
Laser Jet 4ML	985
Laser Jet 4P / 4MP	939/1355
Laser Jet 4Si / 4SiMX	2875/3995
Laser Jet 4V / 4MV	1895/2749
Accessories :	
- Color Kit for 540	49
- Duplex C2061A for 4Si or 4SiMX	495
- Envelope Power Feeder 75 Sheet (HP4)	279
- J2550A Jet Direct TP	329
- J2552A Jet Direct Combo	395
- Legal, Letter or A4 250 Sheet Tray (HP4)	99
- Legal, Letter or A4 500 Sheet Tray (HP4)	109
- Lower Cassette w. Letter Tray (IIP, IIIP)	149
- Optional 500 Sheet legal Letter A4 (HP4)	279
- Postscript for LJ4	329
- Postscript C2013A for 4Si	575
- Toner for II, III	84
- Toner for IIP, IIP+, IIIP	76
- Toner for 4	109
- Toner for 4L or 4P	69
- Toner for 4Si	135
- Toner for 4V	149

LASER MASTER

Win Printer 800 Postscript	1075
Win Printer XL600 11x17, 600x660ppi	2350
Winjet 1200 (postscript for HP4)	*(650)
Winjet 1200+ (postscript for HP4+)	*(675)775

MICROTEK

TrueLaser MTP-306 35 fonts, 6ppm, 2MB	*(795)

OKIDATA

ML184T 9 pin, Par	229
ML320 9 pin, Epson compatible	325
ML380 24 pin, Epson compatible	235
ML590 24-wire	429
OL400E Laser / after rebate	515/440
OL410E Laser 4ppm, 600ppi	*(645)
OL410E/PS Laser Postscript	*(799)895

PACIFIC DATA

ProTracer II Ink Jet (CAD Plotter) a4 to A2 size, 360dpi, I960RISC, 512k, 45dBA	979
ProTracer II-GL2 w. HP-GL2 & 2MB	1369
Accessories :	
- HP-GAL Emulation Card	375
- Ink Cartridges	19.50
- Postscript Emulation Card	375
- Sheet Feeder I / II	135/115

PANASONIC

1150 9 pin, 55dBA	139
1624 24 pin	379
2023 24 pin, Quiet	185
2123 24 pin, 43.5dBA, Color capability	239
2130 Quiet Dot Matrix / after Rebate	199/169
2135 Quiet Dot, Color / after Rebate	255/205
3123 24 pin, Quiet, Scalable Fonts	259
3124 24 pin, Scalable Fonts, LCD	329
3624 24 pin, Quiet, 46.5dBA	399
J250 Ink Jet, 300dpi, 128 nozzle printhead	*(259)
4410 Laser 5ppm, 512k	429
4430 Laser 5ppm, 1MB	665
4400 Led Page / after Rebate	449/399

(price) . . . . special, while supplies last

4440 Laser 10ppm	995
4455 Postscript 11ppm	1695
5400 Led Postscript 4ppm / after Rebate	599/499
SP-100 Multi-function printer	749
Accessories for 4410, 4420, 4430. 4400 4440, 4450 4450i, 4455, 5400 available for details and prices	***call Norman***
Other Accessories :	
- 32k Buffer Dot Matrix KX-P43	65
- Auto Sheet Feeder for 1124 KX-P36	120
- Color Upgrade Kit KX-PCK11	55
- Serial Interface Card PS-13	75
- Single Bin Cut Sheet Feeder KX-PT10	95

SEIKO

Smart Label Printer Plus	*(99)
Smart Label Printer Pro	245
- Standard Label (2 rolls)	7.95

SUMMAGRAPHICS (Plotter)

DMP-60 A to D Size	1275
DMP-61 A to D Size	1275
DMP-161 A to D size	1599
DMP-162 A to E size pen	1899
Hiplot 7100 A to D w. stand	1999
Hiplot 7200 A to E w. stand	2355

TEXAS INSTRUMENTS

Printers	call

LASER PRINTER ACCESSORIES

PACIFIC DATA

25 in One! for HP DJ500	99
25 in One! for HP II, IID, IIP, IIP+, III, 4Si	245
Complete Font Library for HP III, IIID, IIIP	255
Font Bank for all HP Lasers (stores soft fonts)	
0.75MB / 1.5MB	205/269
Pacific Connect XI :	
for HP II, IID, III, IIID -	
- 5 Port 256k / 1MB (4S 1P)	309/379
- 10 Port 256k / 1MB (10S)	449/519
for HP 4, IIISi, Paint Jet XL300 -	
- 7 Port 1MB / 4MB (6S 1P)	449/649
- 10 Port 1MB / 4MB (10S)	519/179
Pacific DirectNet for Novell	369
Pacific DirectNet for Novell, Unix & Ethertalk	299
Pacific DirectNetEX for Novell & TCP/IP	469
Pacific 4, Postscript for HP 4	259
Pacific Page 2MB, Postscript for HP II	365
Pacific Page II/XL 4MB, Postscript for HP II	699
Pacific Page PE for HP IID,IIP,IIP+,III,IIID,IIIP	279
Pacific Page PE 2MB	385
Postscript 4MB PE/XL for HP III	699
Plotter in a Cartridge for HP II	225
Plotter in a Cartridge PE	
for HP IID, IIP, IIP+, III, IIID, IIIP	225

18. SCANNER

AVISION (flatbed color)

Superior 24 bit, Color/ 256 Gray/ SCSI interface	
- AV600 / AV680 w. Lphoto Plus	509/649
- AV660 / AV680 w. Photoshop 2.5	725/845

HP (flatbed)

ScanJet IICX Color w. Kit	925
- Auto Document Feeder	475
ScanJet IIIP Gray Scale w. Kit	489

INFO

SF3GS Gray Scale 300 dpi w. OCR	265
SF6CP Color 600 dpi w. OCR	415

LOGITECH (hand)

Scanman Easy Touch w. OCR	169
Scanman 256 / w. Omni Page OCR	135/155
Scanman Color w. Omni Page OCR	255
Scanman Power Page	399

MICROTEK (flatbed color)

Scan Maker II w. Photoshop L.E.	549
Scan Maker IISPX 300 x 600 dpi	875
Scan Maker III	2495

TAMARACK (flatbed color)

ArtiScan 24 bit, Color / 256 Gray Levels / SCSI-interface / for PC or Mac	
- w. Photoshop. & OCR 600 / 800 / 1200 dpi	485/585/855
- w. Photostyler 600 / 800 / 1200 dpi	655/755/1025
- w. Photoshop 2.5 600 / 800 / 1200 dpi	655/755/1025
Slide Scan Kit (transparency, slide, X-ray)	
600 / 800 / 1200 dpi	525/525/595

19. TAPE BACKUP

COLORADO

DJ-20 250MB QIC-80	155
- AB-11 External Tape Port	35
- Cable (2FD & tape backup)	6
- DC2120 Pre-Formatted	12.99
- FC-20 Controller	69
- KE-09 External Kit w/o Controller	59
- TC-15 Controller w. Data Compression	155
- Unix / Xenix Driver	99
DJ-35C 340MB Int	179
PT-10 PowerTape 1GB SCSI Int	599
PT-25 PowerTape 2GB 300Kb/s Int	965
PTE-25 PowerTape 2GB Ext	1095
PT-50 PowerTape 4GB 300Kb/s Int	1525 -
PTE-50 PowerTape 4GB Ext	1655
Tracker 250MB / 350MB (printer port)	285/315

CONNER

CNR-2150S 250MB Int	325
CNR-250MQPT 250MB Ext	315
CNR-2525S 525MB Int	469
CNR-4320RT 2GB Int	745
CNR-4350XT 2GB Ext	985
CNR-4324RP 4GB Int	849
CNR-4354XP 4GB Ext	1145
Tape Stor 420MB w. cartridge Int	179

EXABYTE

EXB-2501 750MB - 1.5GB SCSI-2 Int	499
EXB-2501 750MB - 1.5GB SCSI-2 Ext	649
EXB-4200 4mm Dat. 2GB Int	799
EXB-4200 4mm Dat. 2GB Ext	975
EXB-8205 8mm Dat. 2.5 - 5GB Int	1345
EXB-8205 8mm Dat. 2.5 - 5GB Ext	1595
EXB-8505 8mm Dat. 5 - 10GB Int	2035
EXB-8505 8mm Dat. 5 - 10GB Ext	2285
FS1G (2501 + Control Kit) Int / Ext	675/835

HEWLETT PACKARD

35470 4mm Dat. 2-4GB SCSI Int	789
35480 4mm Dat. 4-8GB SCSI Int	885
C1533 4mm Dat. 8-16GB SCSI Int	1059

OTHERS

Mountain SE250 Int	175
Sytos Plus Backup s/w for Dos / Win	99/95
Tape Cartridges :	
3M, Exabyte, HP, Maxell, Sony	call

20. VGA CARD

ATI

Graphics Expression PCI 1MB / 2MB	175/229
Graphics Ultra Plus 2 DRAM w. mouse	199
Graphics Ultra Pro 2 ISA w. mouse	265
Graphics Ultra Pro 2 VRAM VLB	265
Graphics Ultra Pro 2 EISA	315
Graphics Ultra Pro 2 PCI	279
Graphics Pro Turbo 2MB PCI / VLB	379/379
Graphics Pro Turbo 4MB PCI / VLB	589/589
Graphics Wonder 1MB ISA / VLB	135/139

DIAMOND

Stealth 32 2MB PCI	185
Stealth 64 2MB DRAM PCI / VLB	209/209
Stealth 64 2MB VRAM PCI / VLB	299/299
Stealth 64 4MB VRAM PCI / VLB	469/469
Stealth Pro VRAM VLB 1MB / 2MB	235/315
Viper P9000 VRAM 2MB VLB	295
Viper SE VRAM 2MB PCI oem / reg	299/379
Viper Pro VRAM 2MB PCI / VLB	399/399

MATROX

IMP/3AH 1600 x 1200, 3MB ISA	699
IMP/3VH 1600 x 1200, 3MB VLB	699
IMPRO Plus 1600 x 1200, 2MB PCI	415
- 2MB upgrade	265
VLB/2 Plus 1600 x 1200, 2MB VLB reg.	425
- 2MB ugrade	215
VLB/2 Plus 1600 x 1200, 2MB VLB oem	345
PCI/2 1600 x 1200, 2MB PCI	399
PRO/4.5ZV 1600 x 1200, 8MB VLB	1359

MEDIA VISION

ProGraphics 1024 VL 256 Color 1MB	*(199)239
ProGraphics 1024 VL 16m Color 2MB	*(285)339

NUMBER NINE

T134020, 1280 x 1024, 90Hz, S3-928 chip	
- GXe Level 12 VRAM 3MB ISA / VLB.	375/385
GXe-64 DRAM 1MB PCI / VLB	195/195
GXe-64 DRAM 2MB PCI / VLB	249/249
GXe-64 Pro VRAM 2MB PCI / VLB	349/349
GXe-64 Pro VRAM 4MB PCI / VLB	529/529

ORCHID

Fahrenheit 64 1MB PCI / VLB	159/159
Kelvin 64 Windows Accel. 1MB PCI / ISA.	145
Kelvin 64 Windows Accelerator 1MB VLB	145
Kelvin 64 Windows Accelerator 2MB PCI	189
Kelvin 64 Windows Accelerator 2MB VLB	189

SPIDER

Spider 64 1MB VLB / PCI	135/135
Spider 64 2MB VLB / PCI	185/185
Spider 64 4MB VLB / PCI	285/285
Tarantula 2MB VLB / PCI w. free T-shirt	279/279
Tarantula 4MB VLB / PCI w. free T-shirt	389/389

OTHERS

Cirrus Logic Cl5428 1MB	99
Cirrus Logic Cl5428 2MB VLB	145
Cirrus Logic GD5434 64 bit 2MB PCI	169
ET4000 Tseng Lab 1MB ISA / VLB	79/109
ET4000 W32p 2MB VLB / PCI	179/179
MGP Card (monographic w. printer port)	29
Intel Smart Video Recorder	*(369)
Intel Smart Video Recorder Pro	439
Oak077 Super VGA 512k	52
Oak087 Super VGA 1MB	65
Paradise Window Accel 24 bit VGA	*(99)129
Video Plus (video image grabber)	185
V-Mate Pro (flicker free ext. video encorder)	189
WinVision (video capture)	165
S3 Vision 864 64 bit 2MB PCI	179

SOFTWARE

1. CD SOFTWARE

Call for Wholesale Prices

$5.99 Each

- Business Assistant - Clip Media 2.0
- JCSM Shareware Collection
- Jokes and Pranks - Introduction PC & Dos
- Lazer Tax - Selectware
- Shareware Supreme - Software Treasure Chest
- VGA Spectrum - Windows Shareware Gold

$6.99 Each

- American Premier Shareware
- Audubon's Birds - Audubon's Mammals
- California Collection
- Game Arena - Learning Adventure
- Photo CD Collection - Sneak Peaks
- Ultimate Collection : Education & Games
- Windows Expert MPC

$7.99 Each

- 20th Century People - 20th Century Sports
- Best of 20th Century - Capital Hill
- CD Power Box 2.0 - CD Windows Box 1.01
- Chaos Continum
- Dr. Fun Pack - Dr. Music
- Image Compendium - My Talking Dictionary
- Super Games Dos
- Super Game I / II / III for Win

$8.99 Each

- 5 Star Game : Animation
- 5 Star Game : Education
- Adventure in Heaven
- Cybergenic Ranger
- Harry's Story Disc & Coloring Book
- Monster Media '93 - Shareware Heaven
- Sound Library - Too Much Shareware
- Town of Toons - US Atlas 4.0 MPC
- Windows Heaven

$9.95 Each

- 101 Best Games # 1 DOS (~ Top 201 Games)
- Abacus Island - Arcade (companion CD)
- Audio Tester
- Berenstain Bears: Learning At Home
- Best Windows Games (52 programs)
- Better Windows & Works
- Bible Land & Bible Stories
- Bible Study and Games
- CD Game Pak (5 titles)
- Doom Fever + Doom II Accessories
- Font Expert MPC - Font Elegance
- Gus Goes to Cybertown
- Hobbies & Leisure WIN
- Home & Business Partners WIN
- Kids Games (46 games) WIN
- Learn to Read in Wordland
- Learning Games (42 programs) WIN
- Learning Heaven
- Leisure Game Pack (81 games)
- Magic of Alphabet - Mother of Clipart
- MPC Multimedia Showcase
- Newsweek Interactive
- Planet Fun - Quantum Castle
- Shareware To the Maxx
- Sing-a-long Children (Dr. T's) MPC
- Space Shuttle - Thinking Games
- Thunder Media Sound Library
- Top 201 Games
- Top Ware Limited (500 games)
- Top Ware Spiele (500 games)
- Travel Companion - US Helicopter
- US Submarine - World + US Atlas

BRODERBUND

Arthur's Birthday MPC / MAC	36/37
Arthur's Teacher Trouble MPC / MAC	17/37
Harry's Haunted House MPC / MAC	36/37
Just Grandma and Me WIN / MAC	17/37
Living Book Sampler	3.99
Math Workshop	38
MYST MPC / MAC / Guide Book	45/48/16
Playroom	35
Printshop Deluxe CD Pack	*(69)
Ruff's Bone MPC / MAC	36/37
The Little Monsters At School MPC / MAC	36/37
The New Kid On The Block MPC / MAC	35/37
The Tortoise and the Hare MPC / MAC	35/37
Where in the World is Carmen Sandiego oem	19

CD SAMPLERS

Discovery Channel	9.95
Dorling Kindersley	4.50
Kids Learning Sampler	4.50
Mayo Clinic	5.99
Microprose Game	5.99
Star Trek Next Generation Demo	4.99
Under A Killing Moon	4.50

CHESTNUT

All Titles	8.95 each

- 3 Stoogers - Animal of the World
- Betty Boop - Bible and Religion
- Bugs Bunny - Business Clipart
- Charlie Chaplin - CIA Papers
- Classic Cartoon - Clip Art Warehouse
- Comedy Store : Insane Impersonations
- Complete Home and Office Legal Guide
- Computer Reference Library
- Daffy Duck
- Death Star Arcade Battles
- Dictionary and Languages
- Encyclopedia of Sound
- Fate of Star Lords
- Flash Card Video (Math for grade 2-5)
- Game Jumboree - Gardening
- Godzilla vs. Megaton - Ham Radio
- Hilarious Sports Bloopers
- HIV Resource AIDs Guide
- Hugo House of Horrors
- Midi Master Collection - Multimedia Manian
- Night of the Living Dead
- Our Solar System - Personal Finance
- Porky Pig - Sound Sensation
- Technotools - Too Many Type Fonts
- TV Commercials
- The Complete Book Shop
- Windoware - World Traveler

-- Circle of Knowledge (2CD)	16
-- Shareware Overload Trio Pack	19

COREL

Corel Artshow '94 (book+CD)	29
Corel Artshow '95 (book+CD)	32
Corel Gallery	34
Corel Professional Photo CD	*(19) each

- Butterflies - Birds - Coasts - Deserts
- Food - Fields - Hawaii - Insects
- Lakes & Rivers - Mountains - People
- Resident Interior - Sunrise & Set - Wildlife

Corel Sampler	*(9)

DISCIS Series DOS, WIN, MAC

All Titles	*$9.95 each*

A Tree Through The Seasons
Aesop's Fables + Cinderella
Birds and How They Grow
Butterflies Cinderella + Thomas Swimsuit
Dinosaurs Farm Animals
Heather Hit Her First Home Run + Peter Rabbit
Moving Gives Me Stomach Ache + Heather
Long Hot Day At The Ranch + Scary Poems
Night Before X'mas + Long Hot Day At Ranch
Paper Bag Princess + Mud Paddle
Somebody Catch My Homework
Spiders
Tale of Benjamin Bunny + Peter Rabbit
The Scary Poems for Rotten Kids
Whales What Air Can Do

FUTURE THINKING

All Titles	*$8.50 each*

Board Games
Business Tools
Desktop Publishing
Fonts
Fun with ABCs #1 / #2
Fun with Spelling
Invasion Force
Math Adventure
Space Games
Super Sports
Bridge & More
Children's Paint
Fantasy Quest
Fun with 1-2-3
Fun with Numbers
Fun w. US Geography
Mail Works
Musics
Story Maker
War Games

LASER SOFT

Advanced Learning Fun (age 8 & up)	16
Animal Magic (6 games) DOS, WIN	*(23)
Apogee's Greatest Hits	12.50
Banners WIN	*(13)
Board & Strategy (26 games)	*(9.95)
Brain Teasers (28 games)	*(9.95)
Business Made Easy	*(13)
Cards and Dice (24 games)	14
Clip Art & Fonts WIN	*(13)
Doom Companion (24 utility programs)	12.50
Early Learning Fun (age 4-7)	*(13)
Family Learning	*(9.95)
Fly and Drive (4 games)	*(13)
Fonts & Clipart Collection	*(9.95)
Graphics & Sound Explorer (33 utilities)	*(9.95)
Home Computer Start Pack (30 programs)	*(13)
Labels WIN	*(13)
Leader Board Golf Game (16 courses)	15
Links Collector Golf	*(14)
Links Solid Gold - 7 Courses	16.50
Pinball WIN	*(18)
Private Eye	*(13)
Publishers Toolbox (31 utilities)	*(9.95)
Screen Effects	*(9.95)
Top Tracks	*(13)

(price)	special, while supplies last

Triple Tris	*(13)
Video Arcade Classics (33 games)	*(9.95)
Video Gambling WIN	*(15)
Windows Toolbox (33 utilities)	*(9.95)
Wolfeinstein 3D + Blade Stone (companion edt)	14

MEDIA VISION

Always Arthur	9.95
Buster First Thunderstorm	9.95
Critical Path oem / reg	17/26
Forever Growing Garden	*(19.95)
Quantum Gate oem / reg	17/24
Who Wants Arthur?	9.95
Wriggling in Story Land oem / reg	17/26

MICROSOFT

Ancient Land oem / reg	29/45
Art Gallery Multimedia MPC	55
Cinemania '94 / '95 MPC	29.95/*(49)
Complete Baseball oem / reg MPC	29/*(44.99)
Dangerous Creatures oem / reg	25/45
Dinosaur oem / reg MPC	29/55
Encarta '95 oem / reg MPC	45/89
Entertainment Sampler (FD + CD)	5.95
Golf oem MPC	17
Magic School Bus: Human Body	48
Magic School House: Solar Systems	48
Money	*(9)
Multimedia Beethoven 9th Symphony	55
Multimedia Bookshelf '94 oem / reg WIN	34/*(49)
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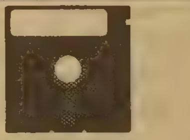

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●

(price) .... special, while supplies last

Continued from page 250

audio clips, fonts, titling templates, and online documentation.

New editing features include a Trim Window with ripple and roll edit controls, the ability to view multiple frames, and dynamic updating of the window. Additionally, Premiere now correctly supports NTSC 29.97 frames-per-second timecode. It also supports field rendering for smoother effects and titles.

A faster preview of edits is available via dynamic previewing, which avoids calculating effects but indicates their presence in the relevant frames. Edit decision lists can be exported in CMX, Grass Valley, and Sony formats. You can read in timecode from any VTR that provides it via the Device Control option, or you can use OCR (optical character recognition) to read timecode off a window dub (a video tape with timecode numbers burned into the bottom of the on-screen image).

The Filter and Transition Factories allow you to build your own filters based on PhotoShop and Illustrator files. You can also use stock PhotoShop filters and vary their effects over time. There are also new filters included in Premiere such as the Gradient Wipe that uses a grayscale image as a wipe template or the Clip filter that trims pixels from the edges of a movie.

There are a host of other new features, improved existing features, and a remarkable overall improvement in speed and smoothness. Adobe has done an excellent job of improving on an old favorite. (Adobe Systems, Inc., 1585 Charleston Rd., Mountain View, CA 94039. 415/961-4400)

CD-ROM Review

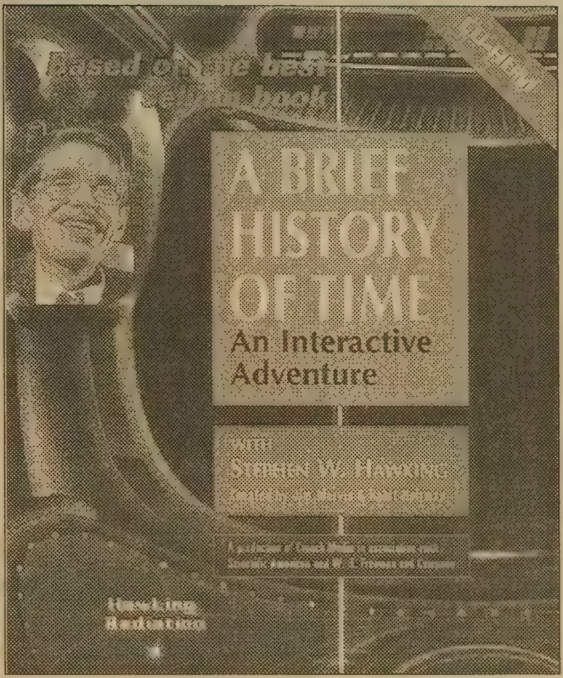
A Brief History Of Time: An Interactive Adventure

Presented By: Crunch Media in association with Scientific American & W.H. Freeman & Co.
Distributed By: Creative Labs
For: Macintosh and Windows
List Price: $49
Reviewed By: Mark Will

The opening screen of the CD-ROM *A Brief History of Time*, shows author Stephen Hawking, noted physicist, in a wheelchair, sitting in front of a picture of Albert Einstein. While the debilitating effects of Lou Gehrig's disease have kept Hawking confined to a wheelchair for twenty years, they have not stopped him from exploring the mysteries of the universe, presenting them in an understandable manner, and inserting some humor into an otherwise very "heavy" subject. Many of the screens are narrated by Hawking in the same voice produced by a speech synthesizer that Hawking uses to give lectures.

The main menu consists of a room (two screens) with clickable objects that are "illumined" when you move your mouse over them. Menu options allow you to view the full text of the book, look through a microscope or telescope, plunge into a black hole in the "Hawking craft," view film clips, or accelerate Einstein's tram car to near light speed on Relativity Street.

While the CD is generally easy to navigate, it is a bit clumsy in places and lacks good search capabilities. The software is very resource-intensive and the documentation makes no bones about it. It took about one minute (on my 486/33 with 8MB of RAM) to reach the opening screen, with more tolerable delays when jumping around the various options. I experienced loss of sound on some narrated screens where animation was occurring at the same time. Creative Labs says this is a known problem with the release of QuickTime for Windows (1.1) and will be fixed in a second pressing using QuickTime 2.0. Despite the current glitches and slow load time, the animations and videos make this an excellent supplement to the book. Marketing the CD and book together would make an ideal combination. (Scientific American, 415 Madison Ave., New York, NY 10017-1111. Creative Labs, Inc., 1901 McCarthy Blvd., Milpitas, CA 95035. 1-800-998-5227) ■



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PENTIUM -66/256C VLB PCI USA	248	628	N/A	918	1,088	1,138	1,308	1,328	1,498
PENTIUM -60/256C VLB PCI USA	248	608	N/A	898	1,068	1,118	1,288	1,308	1,478
INTEL PENTIUM -90/256C PCI	298	858	N/A	1,148	1,318	1,368	1,538	1,558	1,728
PENTIUM -90/256C VLB PCI	198	768	N/A	1,058	1,228	1,278	1,448	1,468	1,638
PENTIUM -90/256C PCI	188	758	N/A	1,048	1,218	1,268	1,438	1,458	1,628
PENTIUM -66/256C VLB PCI	148	528	N/A	818	988	1,038	1,208	1,228	1,398
PENTIUM -60/256C VLB PCI	148	508	N/A	798	968	1,018	1,188	1,208	1,378
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486DX2-66/128C VLB PCI	88	228	$378	498	648	718	868	908	1,058
486DX2-50/128C VLB PCI	88	188	338	458	608	678	828	868	1,018
486DX-33/128C VLB PCI	88	186	336	456	606	676	826	866	1,016
486DX4-100/128C VLB	88	308	458	578	728	798	948	988	1,138
486DX2-80/128C VLB	88	228	378	498	648	718	868	908	1,058
486DX2-66C VLB	68	188	338	458	608	678	828	868	1,018
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486DLC-40/128C VLB	84	128	268	388	538	608	758	798	948
486DX2-66C ISA	58	184	334	458	608	678	828	868	1,018
486DX2-50C ISA	58	148	288	408	558	628	778	818	968
486SX-25C ISA	58	118	258	378	528	598	748	788	938
486DLC-40/128C ISA	N/A	108	258	378	528	598	748	788	938
486SLC-33 ISA	N/A	68	218	338	488	558	708	748	898
386DX-40/128C	N/A	82	220	358	508	578	728	768	918
386SX-40	N/A	54	204	328	478	548	698	738	888

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486DX2-66/128K VLB ...$1,148
486DX2-80/128K VLB ...$1,178
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486DX2-50/128K ISA / VLB	808 / 818
486DX2-66/128K ISA / VLB	838 / 848
486DX2-80/128K VLB	878
486DX4-100/128K VLB	948
486DX2-50/128K VLB - PCI	828
486DX2-66/128K VLB - PCI	858
IBM 486SLC2-66/64K VLB	778
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Pentium P5-60/256K VLB	1,298
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Pentium P5-66/256K VLB - PCI	1,328
Pentium P5-90/256K PCI	1,568
Pentium P5-90/256K VLB - PCI	1,578
Pentium P5-60/256K VLB - PCI USA	1,408
Pentium P5-66/256K VLB - PCI USA	1,428
Pentium P5-90/256K VLB - PCI USA	1,628
Intel Pentium P5-90/256K PCI	1,588

SYSTEM CONFIGURATION

- Motherboard w/CPU
- 4MB RAM (**8MB for Pentium**)
- 420MB Fast Hard Drive
- 1.44MB 3.5" Floppy Drive
- IDE 2HD/2FD Controller w/2S/1P/1G
- 512KB SVGA Card
- 14" SVGA .28 Color Monitor
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- Microsoft Compatible Mouse w/Pad
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HP LaserJet 4L / 4P	638 / 928
HP LaserJet 4MP	1,308
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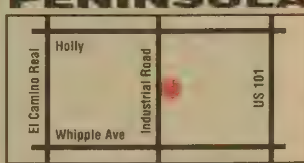

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Gulch GOSSIP

by Jonathan E.

Beyond Wired

Gary Wolf of ***HotWired*** (and previously the Menu Driven food columnist of ***SF Weekly***) and **Michael Stein** of **EcoNet** and the **Institute for Global Communications**, have a dandy, anecdotal guide to the part of cyberspace they call "the aether." ***Aether Madness*** is published as an old-fashioned book by Peachpit. It's a user-friendly guide with an emphasis on interesting destinations rather than technology. It can't avoid some jargon, of course, but it's actually readable, which is a fine accomplishment in this field. ...

With its elegantly stark January issue, ***Wired*** finally came close (but not all the way) to accepting my August 1993 suggestion that it use only black ink. However, other competing publications have been batting the *Wired* empire around a bit with snide remarks about pretentious press-releases and questions about just what the much-vaunted "world beat colors" of *HotWired* are. ***The New Republic*** ran a hypercritical story by **Gary Chapman**, whom **Will Kreth** points out was also the author of *Wired*'s first published letter in its second issue.

Meanwhile, the peripatetic **Howard Rheingold** resigned as executive editor of *HotWired*. Previously the reason was thought to be that he felt that publisher **Louis Rossetto** was only interested in providing a cool place on the Web for advertisers, but upon further reflection Rheingold decided that it was because "I have a toxic allergy to hierarchical organizations."

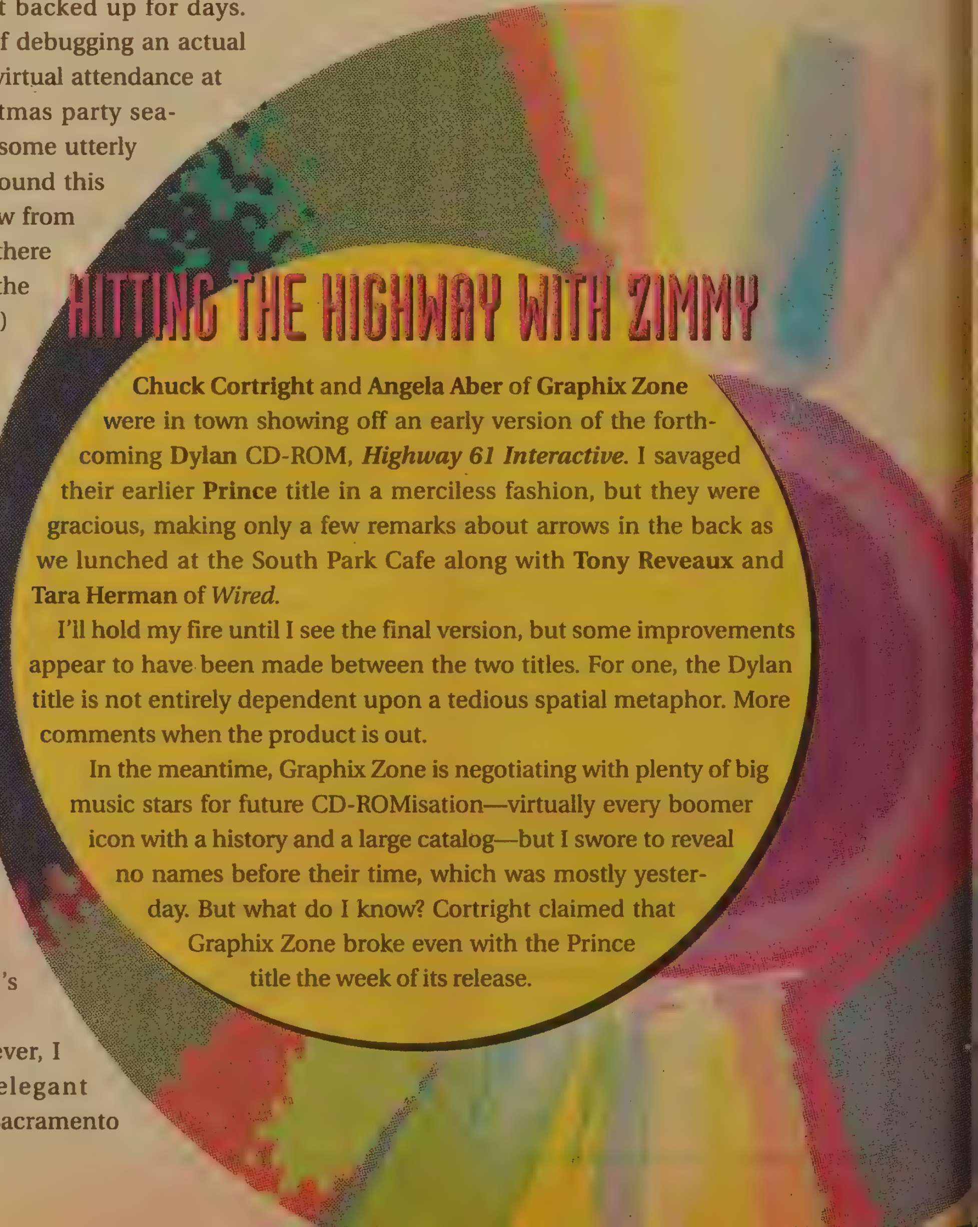
THE LIFE OF THE PARTY

It was late at night in my lab. I was doing some last-minute beta testing on my bio-bit phase reversal unit before releasing it to the Christmas market. I was going to become rich beyond my wildest dreams. The bio-bit phase reversal unit promised to banish sickness to the virtual realm and make partying an actual good thing to do.

Unfortunately, I accidentally rewrote some lines of code causing an immense system crash. Even more unfortunately I hadn't backed up for days. What followed were weeks of debugging an actual debilitating illness and only virtual attendance at the all-important pre-Christmas party season. Really, there have been some utterly unpleasant colds and flus around this season—as many of you know from your own experience. If ever there was a time I wanted to leave the meat (wetware if you prefer) behind, it was in December.

Thus I missed not only the IICS annual Christmas showcase, but also **Fred Davis's and Sylvia Paul's CyberSalon** discussion of computer-induced insanity, **Jonathan Wells' and Bart Cheever's** of Digital Pictures fabulous-sounding party complete with its own WWW navigational info and a Pong battle, **Silent Records'** ambient Christmas celebration at Kubala's, and **CyberLab 7's** reportedly lively bash.

The previous week, however, I checked out **Trilobyte**'s elegant soirée at The Mansions on Sacramento Street to show off ***The 11th Hour***, the sequel to the immensely successful ***The 7th Guest***. It's a very spooky looking title, with plenty of live-action video as well as rendered graphics. Trilobyte developed several tech tricks in an attempt to achieve television quality. Based on the short excerpts shown, I'm not sure they got all the way, but it was still visually impressive. It'll be released through Virgin Interactive in February.



HITTING THE HIGHWAY WITH ZIMMY

Chuck Cortright and **Angela Aber** of **Graphix Zone** were in town showing off an early version of the forthcoming **Dylan** CD-ROM, ***Highway 61 Interactive***. I savaged their earlier **Prince** title in a merciless fashion, but they were gracious, making only a few remarks about arrows in the back as we lunched at the South Park Cafe along with **Tony Reveaux** and **Tara Herman** of *Wired*.

I'll hold my fire until I see the final version, but some improvements appear to have been made between the two titles. For one, the Dylan title is not entirely dependent upon a tedious spatial metaphor. More comments when the product is out.

In the meantime, Graphix Zone is negotiating with plenty of big music stars for future CD-ROMisation—virtually every boomer icon with a history and a large catalog—but I swore to reveal no names before their time, which was mostly yesterday. But what do I know? Cortright claimed that Graphix Zone broke even with the Prince title the week of its release.

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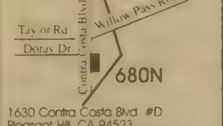

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GULCH GOSSIP *continued...*

FLORIN IN ZENDA

Fabrice Florin has set up a new development company, **Zenda Studios.** Five titles are initially planned for publication by **Sanctuary Woods,** but it's hoped that all will also be transportable to interactive TV. Sanctuary Woods continues to work with other developers with a special emphasis on titles for those between seven and fourteen years. ...

BEATING THE TRACK ONE PROBLEM

Roger Cloud announces that he has succeeded in creating "the world's first full-length audio-enhanced CD with no 'track one' problem!" There's about an hour's music with fourteen tracks in a style, or styles, that Cloud says is all over the board. There's also a data track created with Director and using QuickTime that has ancillary materials of printable lyrics, liner and technical notes, and a full-length music video.

The significance of "no track one problem" is that you can stick the disc in your audio CD player and just hit play with no need to skip to track two as has previously been the case with mixed-mode discs. In an age of convenience, not to mention multimedia where we'd really like to keep the inventory control difficulties of differing platforms down to a minimum, this could be significant. So far the disc is Mac only, but Cloud plans to continue work and do Windows. Email him at *cloud98765@aol.com* for further details. ...

ABSOLUT LUDTKE

Finally, it must be a sign of absolute arrival in some heady cultural circles that **Jim Ludtke** has an **Absolut** ad on the back of *Wired.* For a more interactive experience with Jim, check out the new **Residents** album/CD-ROM, *Gingerbread Man,* on Ion. If you missed it, I have more to say about it in this issue's Multimedia 101 column—but do note that it has that old-fashioned "track one" problem. ■

Voices Carry

The night of Trilobyte's event, **Bob Ayres** threw a well-attended and almost rowdy Last Saturdays mixer/industry schmoozefest at the Capp Street Gallery. The exhibition at the time was a variety of interpretations of the **Stars & Stripes**, making it a very red, white, and blue event—I was quite amused by the huge pile of blue jeans along with a pile of white shirts and one of red clothing. No one seemed to actually remove their garb to add to the art or even use them as a convenient coat check—but I'd be surprised if no one was tempted. Thankfully, there wasn't much in the way of product display, but **Steve J. Ott** was showing his **Voxware** software that, amongst other sonic wonders, can change anyone's voice into anyone else's. One observer pronounced this as something that would change the world, and it's easy to see its relevance to prank calling—or advertising. It's based on actual samples of voices, so, of course, if you want to change yours into the voice of someone famous, you have to license the famous one's voice. The party eventually moved next door to Cava 555 and continued for hours, with many vocal impressions of the unlicensed famous.

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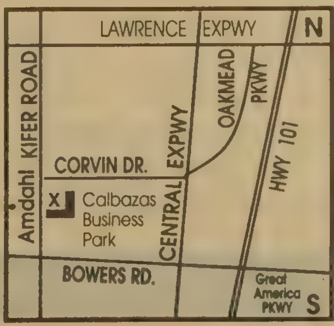

Yet More Adventures In The Land Of Interactive Music

MediaBand Part 2,

Plus Gingerbread From The Residents

Last month we left Marc Canter explaining his goal: "I want to create a new type of technology, and that technology is multiple-user, real-time performance software." He was also in the process of forming the MediaBand to demonstrate his concepts and had just decided not to pay the band members as a test of their loyalty. Two of the four, including Todd Rundgren, left the band as a result.

In our conversation, Canter explained how he reached that point: "One of the secrets of MacroMind was that we always had someone using the tools. That created the process of iteration. So we didn't create a spec, go off and write it, and then show it to the user. Every day," he said with emphasis, "we changed the spec, a very unusual strategy by the way. So as I invented this new technology for my second company, I realized that I needed somebody to use this multiple-user, real-time performance software, and that meant a band, because they had to be a group of people. I thought, 'Gee, if I'm going to do a band, I might as well redefine the concept of a band, so let's create a media band, let's go all the way.' Right?

"And then I thought, 'Well, that's great, but who the hell cares about Marc's media band? Let's get a mythology around it.' So we created the story of four students who went to the John Cage Academy of Multimedia some time in the future. And, of course, what they did was to get together in a band—they were the four top students.

"Like any other band, they had a horrible breakup."

> *At this stage, Canter obviously straddles the worlds of showbiz and software as confidently as anyone and more competently than most. There's certainly some hot air here, but it's entertaining hot air.*

TRUE LOVE AND TECHNOLOGY

The story continued with two of the band members becoming lovers, although Canter used a considerably more graphic description, while the other two, too shy to reveal their attraction to each other, went their own ways. One, the hero, worked as an encryption expert for TRW while the other became an anonymous animator in a Korean animation factory. One day, the hero discovered the animated, multimedia diary of the lead singer accidentally backed up on one of his own cartridges. Both the depth of her affection for him and the artistic key to producing live-performance multimedia were revealed to him. He determined to find her again and reform the band.

He called in all his hacker friends and together they pulled off the greatest act of unauthorized entry to systems ever. His message of love for her appeared on every single computer screen, all the world's ATMs displayed the lyrics of his love song to her, the Good Guys video wall and the Goodyear blimp both beamed the words out, they were literally everywhere including Times Square and Tokyo. The "girl" could not escape, the lovers became happily united, the band reformed—and the hero is busted by the FBI.

"That's the end of Act 1," says Canter. "It's a real screenplay and it's included on the *Meet MediaBand* CD-ROM as a text document."

THE COMPLEAT CANTER

There's more to the story, but that's the flavor of Canter's personality—rather all-encompassing,

BY JONATHAN E.

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DEALER WELCOME

ebullient, and quite utterly without reservation.

Anyone who's heard him talk about Windows will know that he can also be scathing even while being humorous. The liner notes for *Meet MediaBand* include the question, "Who's gonna kick little Billy Gates' ass?" In our conversation, Canter forthrightly stated that his dislike is based on Gates selling "code that sucks."

Much to my surprise, a Windows version of *Meet MediaBand* will be out shortly, but Canter warned that "it's fine as long as you've got a string of garlic on, you're surrounded by salt, and you've got a large crucifix in your hand ready to stab him in the heart when he comes too close."

At this stage, Canter obviously straddles the worlds of showbiz and software as confidently as anyone and more competently than most. There's certainly some hot air here, but it's entertaining hot air. His ambitions are huge, and include such goals as producing interactive work with artists such as Janet Jackson, Billy Joel, and Third World.

Not to mention taking the MediaBand on the road with a very elaborate set (he was sketching it out at the time, it's more like a whole circus tent or an arena than a set), setting up his own label *a la* music biz, and writing an opera. You know, I wouldn't be surprised if he did them all—but it's show biz and high finance and nothing is certain except that someone's always coming up behind you.

Maybe even in the form of The Residents!

THE RESIDENTS' GINGERBREAD MAN

A couple of months after the release of *Meet MediaBand*, Ion released The Residents' second CD-ROM, *Gingerbread Man.* There are some similarities between the two, but also some substantial differences. It is also a totally different approach to interactive media from their first CD-ROM, *Freak Show.*

In some ways *Gingerbread Man* raises the ante by providing a considerably more involving and interactive experience; in other ways it's a sidestep from *Freak Show*, and possibly less involving. I almost wonder if perhaps the field of interactive music will develop so quickly that work of only a few months ago will appear hopelessly outdated. This is, of course, one of the features of a true pop music market—but considering the time and expense involved in developing CD-ROMs, and their relatively small market, it's perhaps not the best news for developers.

On the other hand, it keeps it interesting for journalists and consumers. And this is important, because frankly, although both CD-ROMs are outstanding in their field, neither really offers the continued enjoyment that an old-fashioned linear piece of music can. Nor, I would guess, do they offer the pleasure that authentic music making or playing does for a musician.

Gingerbread Man is actually a hybrid disc containing ten songs of about thirty-six minutes of Red Book audio that play in ordinary CD players and one data track for CD-ROM drives that has interactive versions of the same songs. The interactivity is technically very impressive; the disc is a must-see for those reasons.

Artistically, well.... It's only fair to say that The Residents, along with their graphics crew, did not brew my cup of tea. Not that it's without merit, it's just that I get my musical joy from other places. This is not too surprising, since The Residents' music very rarely (if ever) seems to be about joy of any kind and *Gingerbread Man* is "an interactive musical study of nine characters," whom the liner notes freely admit live in their individual "tormented worlds."

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MULTIMEDIA 101 *continued...*

Thankfully, the escape key works just like its name.

The main screen is called the "EnterEye." (The Residents have some sort of fixation about eyes.) There's a little Gingerbread Man who spins around in the middle of the screen. If you hold him down, he'll spin faster and faster, sometimes vocally complaining about it and sometimes appearing to almost enjoy the sensation. He's spinning inside a circle of pairs of eyes, highlighting each as he passes. When he stops, they utter a short phrase.

The Gingerbread Man is very responsive to mouse control and easy to point wherever you want him. Click on a pair of eyes and you get that character's song, aka its "tormented world." It's worth noting that both the position of the characters and the associated phrase change as you reenter the EnterEye after checking out a song.

> ***Marc Canter: "And then I thought, 'Who the hell cares about Marc's media band? Let's get a mythology around it.' So we created the story of four students who went to the John Cage Academy of Multimedia some time in the future."***

This deliberate obfuscation is almost the Residents' trademark, as those who are semi-familiar (which is about as familiar as you can get) with them know. Over the years the individual Residents have remained steadfastly anonymous, cultivating an air of mystery and a strange world of their own anti-personality—to the point where it *is* their personality, as well as a crafty marketing technique. The manual for *Gingerbread Man* continues this theme in an almost heavy-handed way, with much reference to "sources close to The Residents," mention of odd methods of communication between The Residents and Ion, and warnings that "since we're talking about The Residents, we obviously will never really know."

What is apparently true is that, while The Residents produce the music and Jim Ludtke and a team of other named artists contribute graphic design, Ty Roberts and other members of the Ion team do the actual programming. Thus, the truth behind the claim that "even The Residents themselves have no idea what will happen during the playback of a song" is perhaps a little, ahh, shaded—but still true.

TORMENTED WORLDS

Once you enter the "tormented world" of a character, there is an initial sequence of music and graphics with which you cannot tamper—sorry, I mean interact. Shortly, however, you are cued by the reappearence of the cursor, appearing as a nifty top-hatted eyeball with tiny little letters spelling out the name of the song within the eyeball, indicating that you are now able to make things happen.

Basically, your mouse can drag the character's head around as a paintbrush, while different sets of keys on your keyboard will trigger different visual and audio elements, e.g. Y-P will make the character speak (with phrases that are also used in the EnterEye screen) or occasionally sound like a detuned harp; Z-M will reveal relevant life images while A-G will produce the character's animated thoughts.

There's actually a lot going on, and it's very robust—I hit every key repeatedly and simultaneously and it never crashed, although

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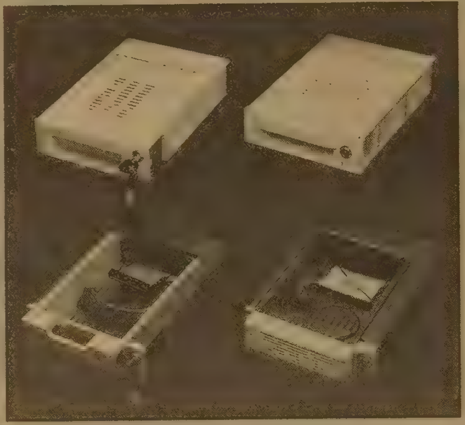

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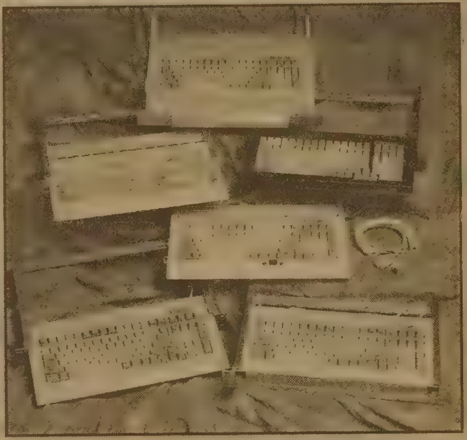

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not everything that should have happened actually happened—or maybe it did, but so fast that I couldn't catch it all. There are, in fact, so many options to choose from that, in the three minutes or so that each song lasts, you can't really check everything out. The song ends with another short noninteractive sequence and you're returned to the EnterEye.

There are a couple of important features here: One, this is still a plotted linear experience with a beginning and an end that you don't have any control over besides quitting it midway. You can't play it endlessly as you can with either of the songs in *Meet MediaBand.*

Two, this provides a greater degree of repeatability than either of the MediaBand songs, because you have so many more options by being able to use the keyboard as well as the mouse. Additional repeatability is provided by a similiar feature to Canter's "the more you click, the weirder it gets" concept, because some keys do different things at different times in the song, and perhaps on subsequent plays; also, sometimes (but not always) when you leave a song, an additional sequence about that character is triggered. Of course, The Residents and/or Ion claim that this is all simply part of the unpredictable and experimental nature of their world.

There's also a warning sign. Even with all this added complexity and repeatability, the experience is not particularly enthralling for all that long (and this observation is made after discounting aesthetic taste and considering several other similar products). So hitting keys will bring up a graphic or trigger a sound; sometimes you get what you expect and you experience some sense of control (which is, of course, a key issue when you're sitting in front of a computer) and sometimes you'll get something new and hopefully wonderful—but either way you're basically getting canned goods. There's no real feeling of creativity.

NO HOLY GRAIL

Interactive music's theoretical Holy Grail is to provide the user with an experience equivalent in emotional intensity and enjoyment to either listening or playing, but somewhere between doing something and being able to do everything there's an uncomfortable void.

Both *Meet MediaBand* and *Gingerbread Man* are extremely interesting in themselves, and valuable signposts towards an unknown future. However, both are essentially the traditional artists' approach of presenting a vision. I believe that when we say interactive music we mean more than just point-click-and-select, that somehow there's a way to foster more creativity in the user without requiring him or her to be a musical genius but without making "mistakes" impossible—after all, that's how you learn.

The problem with these two CD-ROMs is that once the learning is over, so's a large portion of the enjoyment. I think that what's needed will most likely require more than just a mouse and a QWERTY keyboard (I don't think I mean a MIDI air-guitar either—but certainly some think that's one possibility!). I think it's likely that such a goal requires more of a components approach rather than a titles approach.

As Tim Glaser of SBD Productions put it in one of many conversations about this subject, "What we're looking for is a combination of drum machine, pop single, and rave poster." That's beginning to imply to me that the combination is one you put together yourself from a choice of drum machines, pop singles, and rave posters—all in digital form, of course. If you've sufficient interest, you can already do it in the analog world—DJs and their crews do it all the time. ■

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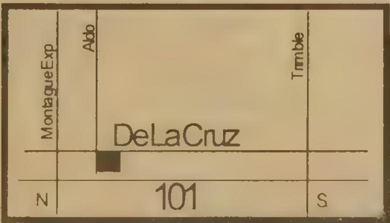

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MacroSystem is shipping accelerator boards in various configurations for both the Amiga 4000 and 3000, with built-in SCSI-2 Fast DMA controllers. The high-end versions sport 40MHz '040 CPUs, while the low-end model for the A4000 allows you to transplant your existing 25MHz '040 chip and RAM to the WarpEngine for up to a 100% speed increase. (Note: There is no CPU-less version for the A3000.) A4000 WarpEngines can hold up to 128MB of RAM (using 32MB SIMMs) while the A3000 versions top out at 64MB.

Because the SCSI controller is mounted directly on the board, you don't have to worry about any Buster chip problems or incompatibilities like you do with Zorro III expansion card alternatives. Also, it doesn't occupy a Zorro slot and is much faster than any expansion-bus card.

WARPING AN A4000

The A4000 installation instructions are very good; I had the accelerator portion of the WarpEngine up and running in about a half hour.

The hardest part of the installation was removing the plastic faceplate from the case. Commodore did a nice job with the drive subassemblies (much better than on the 3000), but the faceplate is held by several snaps which are difficult to undo without breaking them. (Make sure you take the appropriate anti-static precautions when working inside your machine.) A nice thing about the A4000 WarpEngine setup is you can add RAM and change jumpers after the board is installed.

> ***Better hard disk performance, greater computing power, straightforward installation, and solid design—you get it all from WarpEngine.***

To test the board I got a 32MB SIMM from H. Co. Computer Products. (Incidentally, Lawrence Burkey at the company was exceptionally helpful and knowledgeable in finding the chip I needed for the WarpEngine.) The WarpEngine is optimized for 60ns RAM, although you can use 70 or 80ns chips, or even move existing motherboard RAM, with a decline in performance. There are four SIMM sockets which can hold a mixture of 4, 8, 16, or 32MB SIMMs. (Note: Ignore the instruction to rotate the SIMM "towards you." In fact, you have to rotate it away from you.)

The manual has a great suggestion: to move the A4000's IDE drive to the unused space just below the floppy drive. This allowed me to put a half-height 3.5" 1GB drive in its place. (Normally there is only enough room to add a low-profile [1" high] 3.5" drive in that spot.) This left the 5.25" drive bay open for future use.

You should definitely follow the manual's advice to place the four plastic standoffs in the motherboard first, when installing the WarpEngine. I also found that it helps to pinch the tips of the standoffs with a pair of pliers to make it easier to snap the board in place.

WARPING AN A3000

Aside from the lack of the AGA chipset, I often prefer to use my A3000 over my A4000. I give up a lot of speed, but I like the deinterlaced display and the on-board SCSI controller. Well, with MacroSystem Development's 40MHz '040-based WarpEngine for the A3000, I no longer have to give up speed.

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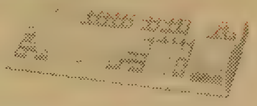

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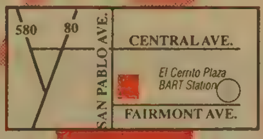

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AMIGA *continued...*

Installing the A3000 version is a little more complex. First off, an '040 will not run in an Amiga without Kickstart ROMs. My early Amiga 3000 (circa June 1990) shipped with Kickstart stored as a file on the hard disk. As a result, I first had to install ROMs—I used 3.1 ROMs available from MacroSystem Development. The procedure is a little tricky because the existing ROMs are mounted upside down on a small daughtercard (sometimes called the "ROM Tower") that plugs into the motherboard. You have to remove this, replace the ROMs with the new ones, and plug it back in. You might have to cut through some white plastic straps too. It helps to mark the orientation of the daughtercard and ROMs with a black marker before you remove them.

Although the 3000's design requires you to totally dismantle the machine, everything worked perfectly the first time and I was able to update all of the system files without incident. (If you are upgrading from 2.x AmigaDOS, delete all of the files in the ENVARC:sys directory. Version 3.1 apparently uses different file formats for the system preferences and it won't automatically convert them. You'll then have to reboot and reconfigure all of your system preferences, like fonts, Workbench screenmode, etc.)

The WarpEngine installation instructions come in the form of a three-page addendum. The same SIMM rotation mistake as in the 4000 installation also appears here. The instructions don't say you need to, but you could anchor the WarpEngine with screws using the metal standoffs on either side of the CPU connector already on the 3000's motherboard. (At least mine had them.) Be careful though, I tightened a screw too much and broke off one metal standoff.

> ***The A4000 WarpEngine performed two to three times faster than a stock A4000, while the A3000 version gives a stock 3000 nearly eight times the performance! Aside from rendering-time benefits, your overall system will be snappier.***

There are a couple jumpers on the A3000 motherboard that need to be changed, and a jumper clip must be placed on a pin on a CIA chip. The instructions presume you will know where pin twenty-one is, so for those of you who may not know (like I didn't), here's how you figure it out. The chip will have a round dimple on one end. The pin immediately to the left is pin one. Continuing counterclockwise around the chip, you count up to twenty-one. If you are standing in front of the case looking in, the pin is in the top right-hand corner.

The A3000 WarpEngine is basically identical to the A4000; however, as mentioned before, the maximum amount of RAM for the A3000 version is 64MB. As such, there are only two SIMM sockets, where there are four on the A4000 board.

NO ROOM TO SPARE

There is not much room in the A3000, so make sure the WarpEngine is plugged in all the way and does

continued on page 290

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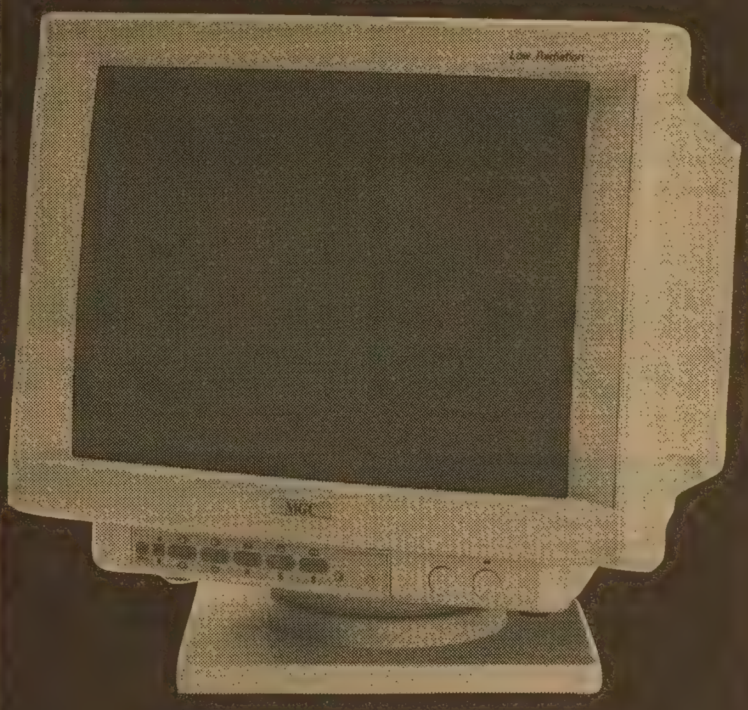

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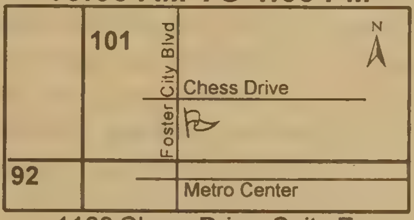

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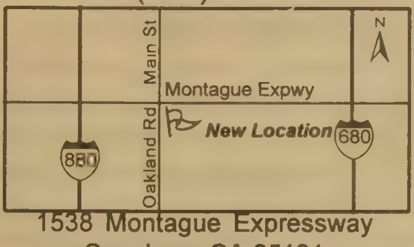

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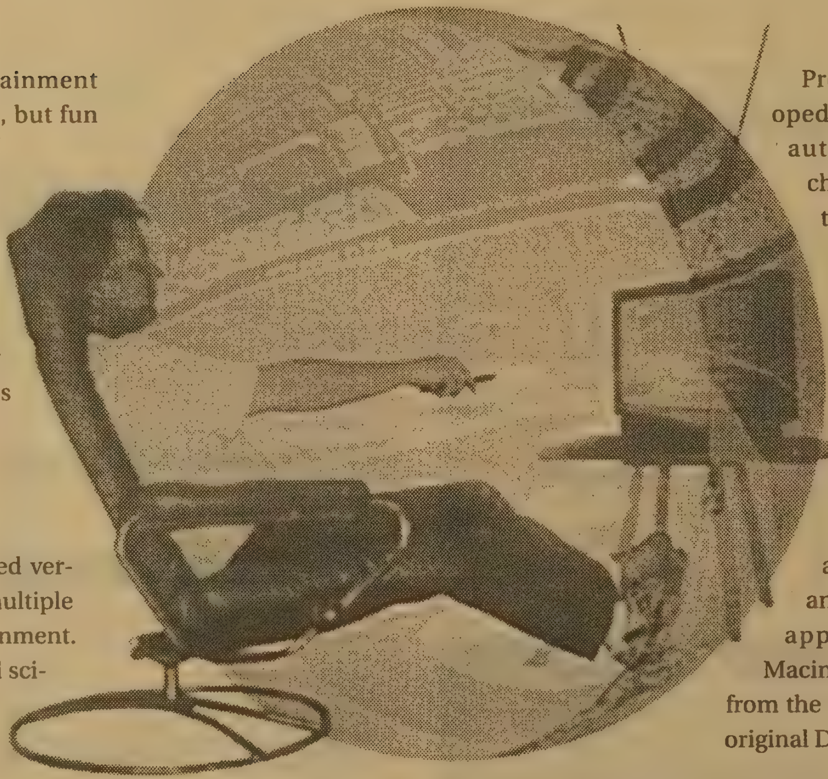
Excellent Edutainment

Great CD-ROM Titles And How They're Made

In this article we'll look at some edutainment CD-ROM titles that are not only useful, but fun for all.

Edutainment design is a formidable challenge for multimedia developers. They must organically combine information, narrative, game play, and entertainment in an interesting, engaging, and original way. Here you can see how different teams have built their wares under the hood.



THE INCREDIBLE MACHINE II

The Incredible Machine, in its floppy-based versions on several platforms, has been a multiple award-winner for computer-aided edutainment. It's a robust amalgam of whimsy and solid science that will nurture "Yankee ingenuity" and stimulate the child/adult (from three up) to learn utilitarian engineering and creative improvisation.

Projects are built from an inventory of 150 parts (ropes, pulleys, pipes, motors, gears, candles, conveyors, cats, buckets, dynamite, pinball bumpers, lasers, mirrors, solar collectors, and electrical components with attached sounds). There are scenic elements like trees, fences, and clouds to create friendly environments. You're presented with an ascending series of 160 puzzles that are like Rube Goldberg constructions gone out for bid. There is also a free-form mode, where you can draw upon the whole range of parts and even adjust the gravity and air pressure. *The Incredible Machine* is designed as a physics system where shape, density, gravity, mass, and velocity will operate in real-world ways, even if many of the elements have a goofy humor about them.

Producer Jeff Tunnell of Dynamix developed Incredible Machine Toolkit in C as an authoring system for creating parts. He chose not to include numbers such as vectors and angles on the screen, because he wanted to keep the program simple and accessible.

The graphics were created in DPaint on an IBM PC in a resolution of 640 x 480 in sixteen colors so that it can play on low-end machines. A great deal of the artwork was done on paper and then scanned in. In the CD-ROM version they were able to add Red Book audio, voice, and movies. Click on a part, and up pops a motion view of a real-world application of that gear or switch. The Macintosh version was authored and designed from the ground up, rather than as a port from the original DOS version.

STRADIWACKIUS: THE COUNTING CONCERT

Three helpful little bookworms beckon the child three years old and up through the frame of the Interactivator tool palette into the luminous, 3-D world of *Stradiwackius*, a $40 early learning interactive playroom which is as nurturing as it is zany.

There, the child can be introduced to music at

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an accessible level while exercising counting, listening, and artistic skills. There are ten game pages involving music and math, with sizing and sorting games, randomly generated so that they are new each time. Wendy's Musical Chalkboard presents songs with lyrics, and lets the child compose his or her own music for each of the ten instruments. Pablo's Paint Session allows children to paint on the instruments with accompanying sound effects.

The Stradiwackius Factory combines true instrument theory with whimsy, providing a Spike Jones-style repertoire of nontraditional instruments such as a bicycle pump, seashell, and air-raid siren. The child can join combinations of them and then play the unique result. Children learning English, French, German, or Spanish can switch "on the fly" between the four versions of the program, though only one is running at any time.

Working on the Macintosh developer platform, the T/Maker team used Macromedia's MacroModel to create the 3-D modeling, Director for authoring, and Strata Studio Pro for rendering. QuickTime is used for audio-only, movies, and movies containing video.

For the Stradiwackius Factory, Dave Shields wrote code that allows sounds to be blended into one external sound file to support the child's unique instrument sounds when they are created. From twenty-four individual sound elements, there can be almost one thousand possible combinations. There are over two hundred sound files for each of the four languages (English, French, Spanish, and German).

LITTLE MONSTER AT SCHOOL

Little Monster at School illustrates the successful Living Books edutainment form—a multimedia storybook. Based on a best-selling Mercer Mayer book, this $40 title encourages early learning of ABCs, numbers, science, and geography for ages three to eight.

Each page/scene is full of discovery animations which draw the user in and support the learning exercises. The stories are spoken with text. Each word can be highlighted to hear it spoken. Many children enjoy creating their own sentences by clicking on different sequences of words. Again, the child can switch between the English and Spanish versions of the program, though not see or hear both on the screen at the same time. Since all the characters are friendly "monsters," no ethnic identification is apparent.

Most of the animation is done in Macromedia Director, but Brøderbund has developed its own cross-platform Living Books Engine based on C, which streams the audio from the CD while the CPU drives the animation. Within a Macintosh graphics environment they use applications like Photoshop and Illustrator, augmented by a host of other custom-built tools. The animators work in an on-screen straight-ahead mode, and also create work on paper which is scanned in. Except for some of the foreign language elements, all of the sound work is created and finished in their own sound studio.

THE SCAVENGER HUNT ADVENTURE SERIES: AFRICA

This $40 title from Davidson is not only a warm and delightful natural history program for ages six to adult, its Virtual Landscape environment points the way to things to come in multimedia. Simply by using the mouse, the user can navigate in 360-degree, eight-directional point of view while journeying through four African regions. Even on a low-power machine, you can visually move around in the screen with the same effortlessness with which you would look around the room.

Hosted by Vica the Vulture, *Africa* is full of learning activities which, with built-in randomness, provide a variety of adventures. As you make your way through the jungle or the savannah, you will be looking for animals to photograph with the camera icon to paste into the correct panes of the photo album. Each animal is animated, with character voices that tell you things about their lives. More information can be found in textbook definitions of plants and animals, including endangered species. You can print out line art pictures of the animals you have photographed.

Produced by Irvine, CA-based SWeDE, *Africa* was authored in L7, its proprietary authoring system, which is object-oriented in C++ with different functional modules. Most of the graphics were done in traditional media and collage techniques, often using natural materials. The backgrounds for the four major environments were large murals. All these were scanned and brought into the Macintosh graphic environment, where Adobe Photoshop and some Illustrator were used. DeBabelizer processed the files for efficient memory management, and to be able to blend the ends of the murals so that they could run in a seamless 360-degree horizontal cylindrical continuity. Each environment has four layers, each with a larger number of animals and details.

QuickTime was used extensively, in 130 interactive animations, and in an unusual way to support the Virtual Landscape. Each landscape is actually

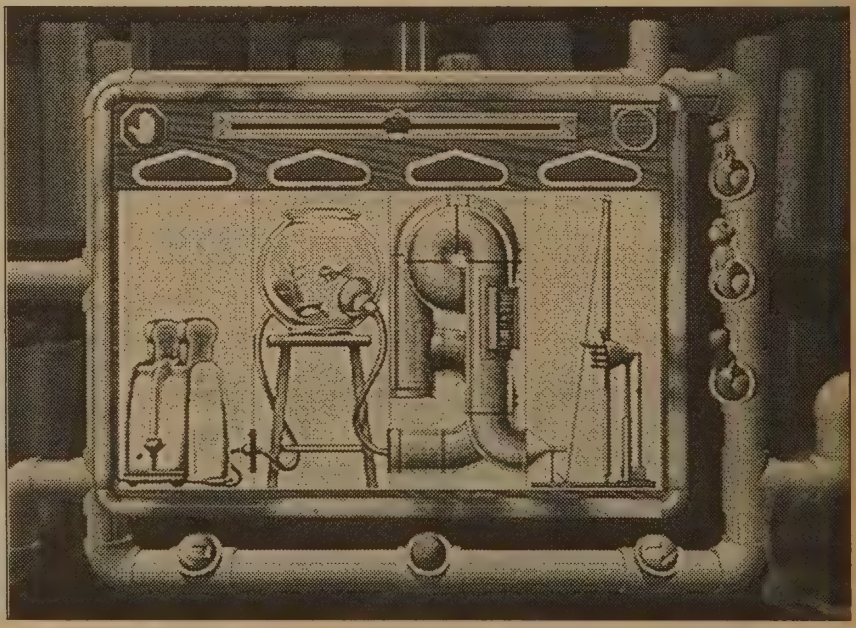
continued on page 292

The ImagiNation Network

Within the next three to five years, interactive television will unleash a bountiful flow of edutainment in every flavor. For those cybersprouts who are online-savvy—and there are more of them every day—The ImagiNation Network (INN) is already switched on.

Founded by Sierra On-Line and jointly owned with AT&T and General Atlantic Partners, INN (Burlingame, CA) provides interactive, online, multiplayer entertainment for IBM PC-compatible computers with a modem. A Macintosh version is said to be in the works. INN also provides access for Sega Genesis Game Systems via The EDGE 16 device (developed by PF Magic) and a TV.

The ImagiNation Network uses the topography metaphor of a theme park, linked with bulletin boards and conferences. SierraLand is an arcade-style action park with games like Red Baron, NTN Trivia, INN 3-D Golf, Graffiti, Stratego, and Rocket Quiz. CasinoLand is an electronic Las Vegas sporting games like Poker, Roulette, and Veracity. The Clubhouse checks in with Checkers, Chess, Bridge, Go, and Hearts. There's an Airport; the Post Office and the Phone Booth support email and a lively online newsletter; The Mall is there for online shopping; and there is a Town Hall for general information. Medievaland supports The Shadow of Yserbius and The Fates of Twinion, two sophisticated online fantasy role-playing games. In the Schoolhouse forum you'll find edutainment content developed by BrightStar. Above all, for a child to gain the skills and confidence of navigating and interacting in cyberspace and communicating across the nation with electropeers, this activity in itself can be edutainment of the highest order.



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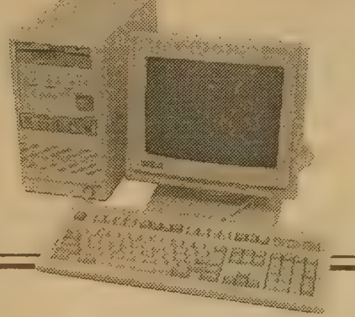

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Multimedia Kiosk Overcomes Designer Anxiety

INTERIOR DESIGNER REFERRAL

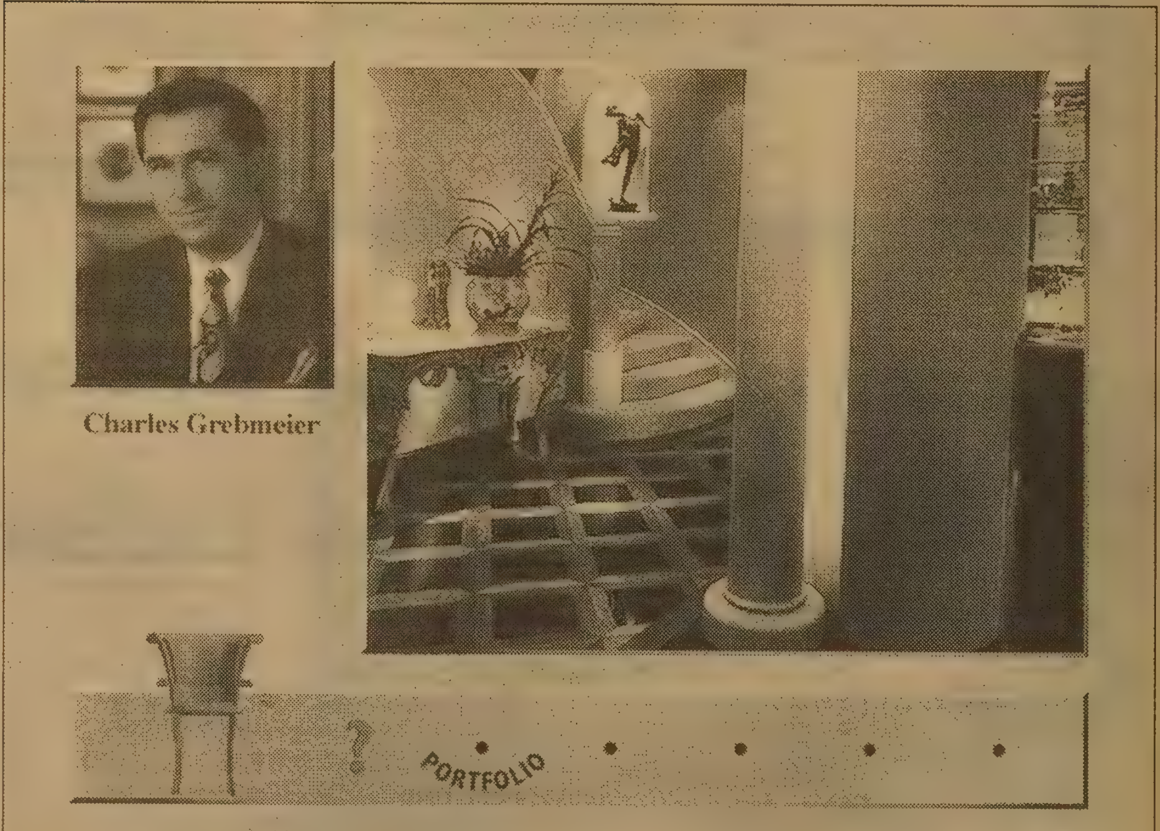
DesignFinder

Interior designers looking for new clients can have a hard time breaking through consumer fears about their profession: that the designer will be overbearing and dictatorial, too far out, too expensive.

When a Bay Area chapter of the American Society of Interior Designers set up a committee to overhaul their referral system, they looked to multimedia as a way to deliver lots of information with lots of style. The resulting DesignFinder interactive touch-screen kiosks will eventually be located in high-traffic areas like shopping malls and convention centers.

Potential clients will type in their contact information, then go through a series of checklists about the project in question. Project categories include Accessorizing a Home, Remodeling an Office, Art Consultation, and Designing a Kitchen. Style choices such as Asian Influence, Outdoor Furnishings, Contemporary, and commercial or residential specialties help narrow the field of designers.

The computer searches its database for designers who fit the criteria. Then it finds designers in the three nearest zip codes to the client, and puts a random list of three on the screen. The client can choose to see information about one of those three



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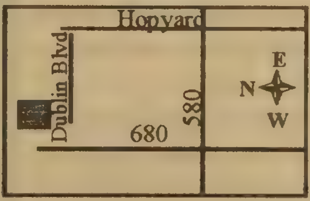

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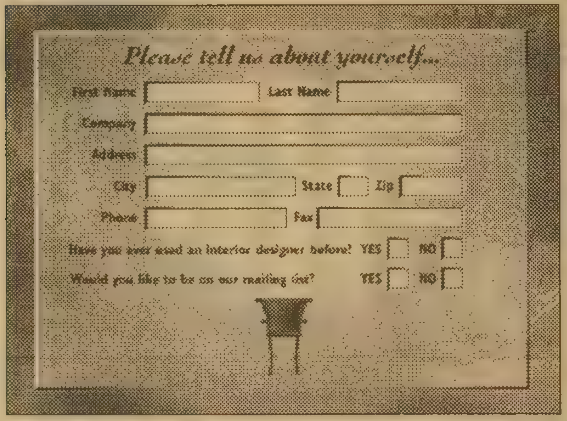

Please tell us about yourself...

First Name ☐ Last Name ☐

Company ☐

Address ☐

City ☐ State ☐ Zip ☐

Phone ☐ Fax ☐

Have you ever used an interior designer before? YES ☐ NO ☐

Would you like to be on our mailing list? YES ☐ NO ☐

designers, or scroll to see more names.

Each designer's screen includes a photo of the designer, the company name and contact info, and a hundred-word description of the business. The client can print a color sheet on any of the designers selected.

TECHNO-TOOLS PROVIDE A BETTER SERVICE

The California North chapter of the ASID has been actively marketing the value of professional design services to Bay Area consumers for several years. Before DesignFinder, says Steve Osburn, chair of the Designer Referral Committee, when someone called the ASID office for a referral, "The system was to pull a name out of a file cabinet."

The ASID staffer would attempt to match the designer's qualifications with the project, but there was no system of tracking who was referred to which jobs. "We needed to offer an equal service to all the membership in the chapter," Osburn says.

Osburn, coprincipal with Joan Malter Osburn of Osburn Design in San Francisco, had been familiar with multimedia technology since the firm had worked with engineers at Xerox PARC in 1985, designing the site and furnishings for a computer-based meeting facility called COLAB. The Osburns also presented the firm's work for Xerox at the Ted2 Conference in 1989.

Since the Referral Committee had a tiny budget, Osburn first set up a database using FileMaker Pro, which the ASID already owned. When the committee presented the database to the ASID board at a strategic planning meeting last summer, all were struck by its potential. Board President Charles Grebmeier, principal of Charles Grebmeier Design in San Francisco, realized the computerized database would give consumers a comfortable way to check out interior designers without the potential embarrassment of a face-to-face.

"Clients don't have to face someone on a one-to-one basis only to find out that the person doesn't have the expertise and experience to work with them," Grebmeier says. "They can do their own research. The system looked like something that worked for both parties. We went for it."

The board decided to release more funds, so that the committee could request proposals from multimedia professionals. The winning proposal came from John Widmer, owner of Wayfinder Systems in San Francisco.

THE WINNING DESIGN

Widmer had begun his professional career as a photographer and illustrator, then moved into graphic design and advertising. He got involved in information design in 1984, when he developed signage and directional graphics for the Santa Barbara Zoo. He founded Wayfinder Systems in 1993, to provide programming, graphics, and interface design fo touch-screen information systems.

Working under a six-week deadline, Widme

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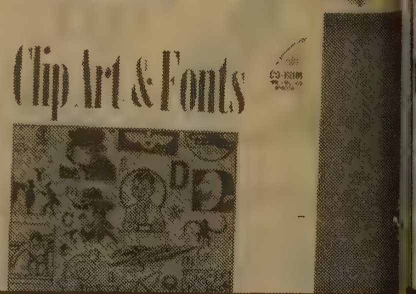
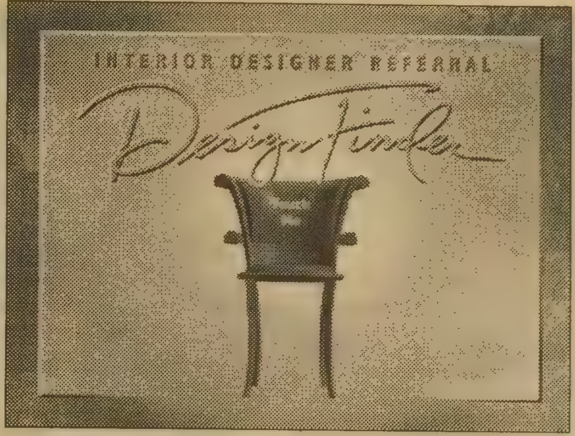

Clip Art & Fonts

walked the board through each step of the creation process, so they could see how he was developing the content and visual design.

Widmer's first step was to create an information schematic on paper, then put that into a skeleton program in Macromedia Director. The program simply showed text on a white screen, but all the buttons worked; the board, paper schematics in hand, could try it out and discuss alternatives.

Next Widmer designed a thematic visual element to tie the piece together. "Since this is the interior design field, the expectation is that everything is presented absolutely magnificently," he says. "I had a board of twenty-six people reviewing the design, all of them interior designers."


INTERIOR DESIGNER REFERRAL
DesignFinder

After paging through design magazines, Widmer chose an elegant chair as a key element which would run through the piece as a way-finder. He modeled the chair in MacroModel, then used Swivel 3-D to make it spin and fly around the screen to indicate movement through the program. There's also a gold ball which moves to identify available buttons.

Widmer designed the screen backgrounds and typographic elements. To make the interface seem warm, Widmer used texture-mapping on the 3-D elements, with plenty of wood grains. The type was given an embossed appearance by making it a slightly different color from the backgrounds and adding drop shadows. Finally, music was developed from royalty-free sound files in Widmer's library. His design goal was to allay users' possible fears of technology by filling the interface with textures familiar from the real world.

Widmer says he had no problem working with so many people, most of whom were unfamiliar with the technology or concepts of multimedia. "Because of my work with the zoo, which had twenty-six people on the board, I'm used to it and really like it. The whole trick is to let people know that what they say is being absorbed and integrated, but maybe not in the way they expect. I try to handle everyone's issues so that the piece meets their criteria."

DATABASE ISSUES

Wayfinder programmer Eric Rosene organized the second module of DesignFinder, the database. Since Widmer feels Macromedia Director is "absolutely awful" at dealing with text, Rosene used HyperCard 2.1 as the database management tool. Widmer finds that although HyperTalk, the programming language used by HyperCard, may be more complex than Director's Lingo, it's more encompassing.

The DesignFinder program must be able to sort through up to one thousand different designers, then display six hundred words in four different categories. "With HyperCard, you can handle a huge volume of data, then you can output an ASCII text file that is sorted and able to be read by Director. We

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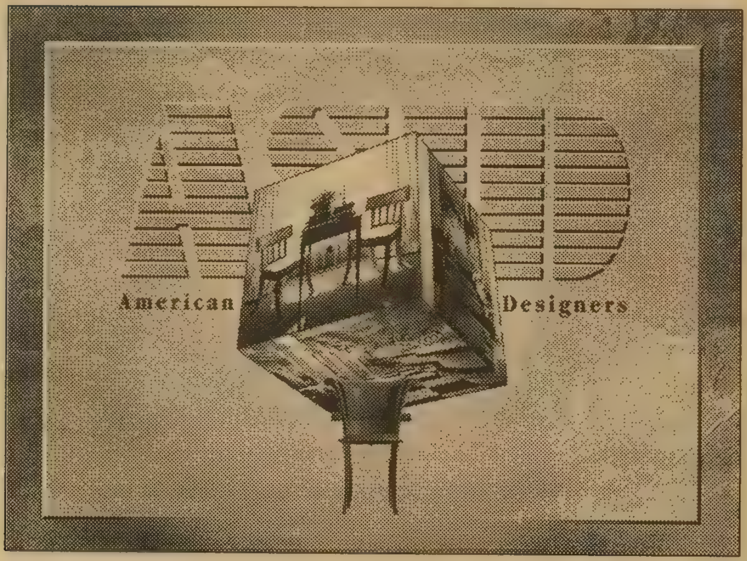
DESIGN FINDER *continued...*



provide the text file for Director as a simple import, a complete file ready for display, rather than requiring Director to go through this process."

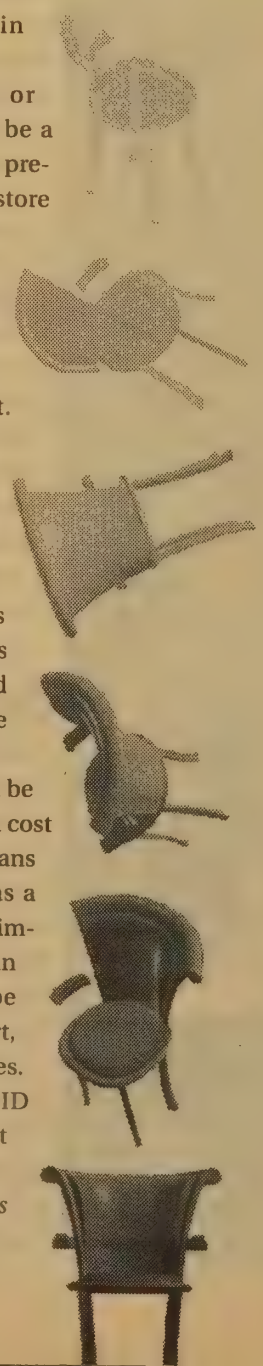
SYSTEM REQUIREMENTS

The DesignFinder program can run on a PC or Mac, but database update must be done in HyperCard on a Macintosh.

The kiosk display can contain a 486 PC or Macintosh with 20MB of RAM. The CPU can be a laptop, which can be pulled out and carried to presentations. A 600MB hard disk is required to store data on four hundred designers. A 14" AV monitor is permanently installed.

Widmer gave the ASID a bonus. "As long as you have the computer and the color printer, why not have the kiosk double as a printing center for marketing materials?" he thought. Widmer had designed a four-color DesignFinder promotional brochure to be used to sign up designers, as well as logos and letterhead. So he simply loaded the PageMaker files for the letterhead, labels, envelopes, and stickers onto the CPU. He says that each color cartridge for the printer costs about $30 and can print up to one thousand sheets, making this solution more cost-effective than conventional printing.

Professional and allied members of ASID will be able to advertise in DesignFinder at an expected cost of between $125 and $175 a year. The chapter plans to sell the program to other ASID chapters as a fund-raiser. Right now, DesignFinder lives in a simple box at the Showplace Design Center in San Francisco. The permanent kiosk design will be chosen in a competition sponsored by Wilsonart, a Texas-based maker of architectural laminates. The design competition will be judged by ASID members. To make an appointment to try out DesignFinder, call (415)864-1500. ■



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AMIGA *continued from page 278*

not get dislodged when you reinstall the drive cage. On my 3000, the floppy drive was in the right drive bay and a 1GB hard drive was in the left. The original 40MB drive was in the rear bay. I found that the floppy drive mounting bracket would press against the fan mounted on top of the '040 chip.

My solution was to move the floppy to the left bay (the original factory location), remove the 40MB drive, and move the 1GB drive to the rear bay. Obviously, before doing this I had to copy all of the files from the 40MB and set up a new boot partition. The easiest way to do this is to boot up with a Workbench floppy disk and then move all of the files.

You may want to drill new holes in the A3000's rear hard disk mounting plate so the hard drive can be mounted with its connectors facing forward. (You'll only be able to use two screws.) This makes it easier for the SCSI ribbon cable to reach everything. Also, the WarpEngine butts right up against the socket for the A3000's expansion slot daughterboard. Therefore, I found it necessary to trim the bottom of the plastic insulation card that fits behind the daughterboard.

Once put back together, the WarpEngine is totally hidden by the drive cage. Adding more RAM or changing jumpers requires total disassembly again. So make sure the thing works before you piece it all together!

THE ART OF SCSI

The WarpEngine worked great with my Toshiba and Micropolis hard drives, Exabyte tape drive, and 44MB Syquest. However, I could not get it to work with my NEC double-speed CD-ROM, and my Sony DAT drive would only work if it was turned off when booting up. I believe I could have overcome the CD-ROM problem if I had configured it properly; however, I don't have the documentation for it.

Some compatibility problems can be solved by changing the SCSI jumper settings on the WarpEngine. For example, I found I needed to use a slower setting to get my older Toshiba drive to work reliably. I also found it necessary to place a shunt on jumper JP1, so that SCSI termination was powered by the bus.

An internal SCSI ribbon cable is provided with the board, but if you have external devices, you'll have to purchase an external connector. The external connector is the 50-pin SCSI-2 variety and attaches to the end of the internal ribbon. On the A4000 you mount the connector using the hole on the back of the 4000 marked "Expansion." For the 3000, you'll want the connector mounted on a backplane to fit in the expansion slot area. You also need a SCSI-2-to-50-pin-Centronics cable to connect to an external SCSI device.

The WarpEngine installation disk comes with a nice utility called SCSITools and a special WarpEngine HDToolBox icon that runs the AmigaDOS HDToolBox program so that it will recognize the WarpEngine SCSI device. These programs are used for initializing and partitioning hard drives.

SPEED

I used the "Diner-West" scene from Brad Schenck's Diner LightWave Objects Set (Terra Nova Development) to test the WarpEngine's performance. The scene includes a lot of reflective elements so it requires a lot of calculation. Resolution was set to medium with overscan.

	A3000	**A4000**	**'040-40 WarpEngine***
No AA	10m24s	4m31s	1m34s
Low AA	35m55s	15m19s	5m22s
Med. AA	54m41s	24m17s	8m39s
Raytracing on:			
No AA	4h30m16s	1h10m33s	35m40s
Low AA	22h3m59s	5h51m39s	2h55m52s
Med. AA	not performed	10h5m40s	5h4m37s

AA=Antialiasing, h=hours, m=minutes, s=seconds

***A3000 and A4000 WarpEngine performance identical.**

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- Upright style case for 3.5" hard drives
- Includes power supply, fan
- 25-pin D-conn can be removed, enlarge hole for your connector
- 2.25" x 6.25" x 7.25" compact size
- Uses IEC power cord (not included)
- Power & drive activity LED's

HSC# 15170 **$39.95**

Computer Parts Specials!

A. Eight-bit VGA/EGA Video Display Card
- 256K VRAM, non-upgradeable, may be used

HSC# 15059 **$19.95**

B. Internal 2400 BPS Modem by Everex
- New card, no software, cables or book

HSC#15101 **$14.95**

C. Mini-tower Power Supply, 145 Watts, Used, 30 day warr.
- 6" motherboard leads, 15" switch leads

HSC# 14730 **$14.95**

Large-scale LCD

- From HP laptop computer (model unknown)
- Epson part number of ECM-A0234
- 7" x 9.25" display area
- 16 pin header on .1" centers
- Factory new in antistatic bags

HSC# 15016 **$24.95**

VGA to RGB Cable

- Ten foot cable
- High-density 15-pin D-sub (VGA type) connector at one end
- 5 BNC Connectors at the other end: Red, Green, Blue, Horizontal and Vertical synch.
- Perfect for those high-res CAD monitors

HSC# 14963 **$14.95**

Handy Power Supplies

A) Switching power supply rated at 5VDC, 3A, Measures 2.75 x 3.25 x 5.25", IEC receptacle for universal (100 - 250VAC, 47 - 63 Hz) input, IEC cord not included, 6' Output cord with DIN plug New in box. HSC#14996 **$5.95**

B) Linear supply rated at 12VDC @ 1200 mA. Input is strapped for 240 VAC input, use as is with 110VAC for lower voltage output, or re-strap it for 110VAC use at 12VDC. Measures 2.5 x 4 x 6.5", IEC cord not included. HSC# 14980 **$5.95**

C) Standard 6' IEC power cord for use with above supplies, misc. colors & styles, used. HSC# 80119 **$.99**

D) Multi-output linear supply rated at 5VDC @ 600mA, +12VDC @ 250mA, -12VDC @ 250mA, 110VAC input, measures 2.5" x 3" x 4.75", generous 4' AC input cord, 5-pin DIN output cord, HSC# 15137 **$14.95**

E) Same as "D" above, only 5VDC @ 500mA, +12VDC @ 1A HSC# 15139 **$9.95**

Computer Speakers

- External speakers by Labtec, model CS-550
- Use with any sound card or personal stereo system
- 4 watt amplifiers (requires 2 C-cells per side)
- Magnetically shielded enclosures
- "Enhanced bass-response cabinet"
- 3" speakers, 40 - 16000 Hz
- Bass-boost and treble-boost switches
- Factory returns, should be OK.

HSC#14977 **$9.95**

External Floppy Drive

- 5.25" half-height 360K floppy drive, beige face
- Sturdy beige enclosure with power supply
- IEC Power cord, 37-pin D cable included
- Case size 6" x 2.25" x 12.5" (great for mounting other external drives, i.e. CD-ROM, etc.)
- New in box, with manual
- 90-day warranty

HSC# 15138 **$24.95**

Network Cable Special

- Dual Workstation Installation Kit
- Two high-quality 10' RG-58 coax BNC cables
- Two BNC tee's
- Two BNC 50Ω terminators
- One BNC coupler
- Enough to cable two Thin-net workstations to the wall-plate distribution point

HSC# 14967 **$9.95**

Transaction Terminal

- Used VeriFone Tranz 240 terminals
- Vacuum-fluorescent alphanumeric 16-character readout
- 12-key keypad ♦ Z-80 proc. ♦ CMOS program EPROM
- Mag-stripe read-head (may have been disconnected)
- Communicates over an RS-485 line
- Needs 8.5 VAC adaptor
- Quantity discounts available

HSC# 14848 **$19.95**

Rechargeable Battery

- 4 "D" Cell-size - 4.8VDC 3500 mAH/5hr NiCd
- Sturdy steel case with mounting ears, pin jacks
- Charge regulation circuitry, .5 A Fuse
- Case size 9" x 4.25" x 2.25" (batteries can be unplugged and removed if desired)
- Unused, 1992 date codes (still good)

HSC# 15067 **$4.95**

Macintosh Scanner #1

- B&W Hand Scanner, SCSI Interface
- 100 to 400 dpi
- 4.134 inch scan path
- "MacSee" software
- New in box
- 90-day warranty
- Requires Mac Classic, SE, LC, SE/30 or II family, 1 MB

HSC# 14809 **$49.95**

Macintosh Scanner #2

- 256 Gray Scale Hand Scanner, SCSI interface
- 100 to 400 dpi, eight-bit (256 shades of gray)
- Image enhancement software
- 4.134 inch scan path
- New in box
- 90-day warranty
- Requires Mac SE/30 or II family, 8-bit video card, 2 MB

HSC# 14808 **$79.95**

New! QRP Kit Specials

- Popular QRP ham transceiver kits by Oak Hills Research
- 1.5 Watt (Sprint) & 3 Watt (Explorer) models
- 30, 40 Meter bands avail. for Sprint, 20, 30, 40 for Explorer
- 100% complete kits with chassis, knobs, etc.
- All coils prewound for assembly ease
- QRP Wattmeter kit WM-1 available for $79.95

Sprint Transceiver Kit	**$89.95**
Explorer Transceiver Kit	**$129.95**

Modem Madness!

- Hyundai external 2400 bps modem
- New in box with telco cable, manual, power adaptor
- CCITT V.21/V.22/V.22bis compatible
- MNP Class 5 compatible
- 5" x 1.25" x 8.5" compact size
- RS-232 serial interface
- Communication Software included

HSC# 15179 **$17.50**

Unusual...Bifilar Wire

- Two color-coded enameled conductors bonded together
- Used for winding RF matching transformers and other exotic induced-voltage applications
- 0.08 millimeters in diameter (looks like the size of a hair!)
- Can be pulled apart (carefully!) and solvent-stripped for solder connection.
- 720 meters on a roll -- Tiniest wire pair we've seen!

HSC# 14376 **$7.95**

Laser Diode

- Toshiba TOLD-9200
- 3 to 4 mW at only 75 - 100mA of current!
- 670nm wavelength (visible red)
- Brand new prime
- Uncollimated, needs current regulation
- Application sheet with suggested circuit supplied

HSC# 15163 **$17.95**

Aerial Dogfight Game

- Lucasfilm's "Their Finest Hour -- The Battle of Britain"
- Historically accurate depiction of key WW II battle
- "Fly" a Spitfire, Stuka or one of six other fighter planes
- Realistic-looking cockpit instrument panel on screen,
- Instruction book has 45 page history of the war with period photographs, campaign maps, profiles and quotes
- Turn on a "cockpit camera" to record your battle
- IBM/DOS,EGA/VGA, AdLib compatible.

HSC#14634 **$9.95**

Cool! Peltier Devices

- Up to 65° C temperature differential (needs heatsink)
- Electronic cooling elements use 3 - 12VDC
- One side gets cold while the other gets hot
- With specification sheet.

HSC# 80121 1.17" square **$20.00**

HSC# 80122 1.56" square **$29.95**

Network in Windows

- Genuine Microsoft Windows for Workgroups Add-on
- Requires Windows 3.1
- Includes Microsoft Mail, Microsoft Schedule +
- Share files, printers with a click of the mouse!
- Connects to Microsoft LAN Manager, Novell Netware
- New in box, adds one workstation

HSC# 15134 **$12.50**

CD-ROM Starter Kit!

- Sony CDU-535 internal CD-ROM Drive (uses caddies)
- Pulled from defective multimedia enclosures (drive OK)
- Single-speed half-height drive, Sony 40-pin interface
- Front earphone/speaker jack, rear audio connection
- New controller card, cable included (no software, caddy)
- 90-day warranty

HSC# 15191 **$49.95**

Multimedia Woofer!

- 60-watt air-suspension speaker with built-in crossover
- Mediavision Model 670-0020, used with CDPC system
- 6" speaker, 30 - 300 Hz freq. response, 40 Watts RMS
- Handsome black styling with removable black grille
- 9" x 7" x 17" cabinet, 1/4" phone plug input (cable incl.)
- New in box, 90-day warranty

HSC# 15178 **$27.50**

Laser Pen times two!

- Solid state laser diode
- 4mW at 660 - 680 nM (visible red) wavelength
- Uses two AAA cells (included)
- One year warranty

A. Brushed Aluminum Case

HSC# MI-16-0006 **$49.95**

B. High-Tech Aluminum Case, with "Blink" mode

HSC# MI-16-0007 **$49.95**

12VDC Mega-power!

- LH Research Super-Mite switching power supply
- Provides 12 Volts DC @ 84 Amps!
- Model #SM11-2/115
- Switching supply, so don't run without a load!
- 115 VAC input, 2000 VA, has 5" fan
- Used, 30-day warranty (void if run without 50% load)

HSC# 15185 **$89.95**

Back-up Tape Drive

- Colorado Memory Systems "Jumbo" model drive
- 120 Megabyte external tape-backup unit
- Requires software (we don't have it, sorry!)
- Interfaces like a floppy drive (37-pin connector on back)
- 6.75" x 2.5" x 10" case with power supply, no IEC cord
- 90-day warranty

HSC# 15171 **$59.95**

HPIB Cable

- Genuine Hewlett Packard (#92220R)
- HPIB/GPIB interface cable, 1' long
- Has dual stackable 24-cond. connector at each end
- Fully shielded, rugged metal hoods

HSC# 14803 **$12.50**

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MultiMedia & BEYOND

AMIGA

continued...

A4000, while the A3000 version gives a stock 3000 nearly eight times the performance! Aside from rendering-time benefits, your overall system will be snappier. Directories will load quicker, icons will pop up faster, screens will display sooner, etc.

The WarpEngine can reportedly handle SCSI transfer rates of up to 10MB/sec. MacroSystem Development tells me they've been able to get 9MB/sec burst and 6MB/sec sustained with a Barracuda hard drive. My fastest drive was not up to that spec, but it was pushing 4MB/sec sustained. According to the company, to maximize hard disk performance you can optionally set the partition block size to 4096 from the default 512. This must be done at the time you set up a partition, however. I tried this and experienced an unexpected substantial reduction in usable storage space. So if you have a lot of breathing room on your hard drive and want top speed, this may be the way to go; otherwise, stick with the default.

COMPATIBILITY

As far as I could tell, the few compatibility problems I encountered were all related to upgrading to AmigaDOS 3.1 on my 3000. In particular, AmigaDOS 3.1 does not like some of the old, but useful, ARP commands. The WarpEngine worked just fine with all of the software I tried, as well as my VideoToaster, Retina Z2, VLab, and Perisound boards.

TRADE-IN POLICY

If you've already invested in an accelerator, Zorro III memory, or Zorro III SCSI board, MacroSystem Development has a very liberal competitive trade-in policy. The following will get you an '040 WarpEngine: $600 + GVP G-Force Æ040; $500 + Progressive '040-28; or $950 + Fastlane, 4091 SCSI, DKB 3128, RCS X-Calibur, or 3640 (this is the A4000-040 CPU board).

COMING SOON

Any of the WarpEngines can be upgraded to a 40MHz '040. The WarpEngine will also be upgradable to the '060 (when it becomes available), probably in the form of a plug-in CPU module. Soon to be released is a 50MHz card for the Amiga 3000, called the ImpulsEngine, that will double the speed of a 3000 and add up to 64MB of additional RAM. The board is expected to sell, sans RAM, for under $500. ■

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RESOURCES:

WarpEngine for the A3000: 28MHz $1150, 33MHz $1295, 40MHz $1495
WarpEngine for the A4000: 28MHz $899 (no CPU), 33MHz $1295, 40MHz $1495
SCSI-2 external connector: $49, $79 with cable

MacroSystem Development, Inc.
24282 Lynwood, Ste. 201
Novi, MI 48374
(810)347-3332

H. Co. Computer Products
16812 Hale Ave.
Irvine, CA 92714
1-800-RAM-CHPS, ext. 122

MultiMedia & BEYOND

EXCELLENT EDUTAINMENT

continued from page 284

a 17MB QuickTime file managed by the navigation module of L7, so that when you "look around" the environment, you are actually scrolling a movie in four different directions.

EDUTATIONAL BOOKS

The recent generation of fully graphic illustrated technical books is very multimediatic at the paper level, even without a CD. The concepts aren't dumbed down—they are isolated, clarified, and projected. These three titles can help the average adult, but are also ideal for the teen or even some pre-teens who are already on their way to personal empowerment in the digital convergence.

Erik Holsinger's *How Music and Computers Work* (Ziff-Davis, $29.95, 153 pp.) can not only serve as the garage band's companion, but open up doors for anyone who wants to extend their Mac or PC into the digital music arena. The author covers all the corners of audio technology and MIDI, from digital audio technology to composition, performing live, and digital audio in film and video, plus hardware and software for building your own MIDI system. You'll have to figure out the name of your band on your own. It comes with an audio CD with enlightening interviews, demos, and samples.

Computers: A Visual Encyclopedia (Alpha Books, $25, 371 pp.) is the "everything you ever wanted to know" source, which explains what you want to know in such a clear, illustrated, and annotated fashion that you can grasp the concepts in minutes. Sometimes seconds. Not only abstract topics like nanotechnology and fuzzy logic, but the upfront on HyperCard and Lotus 1-2-3.

Dante and Blake conceptualized religion and morality into physical paradigms that could be described and modeled. *Programming Illustrated* (Que, $24.99, 192 pp.) tries its darndest to do the same for the ethereal realms of computer programming. Some may argue that the mechanistically driven 3-D graphic structures and processes here over-literalize the architecture of programming, language, and dataflow to the point where some of it may mislead from practice, but it sure beats the hands-waving-in-the-air school of instruction. The only way this book could be improved would be to include software and linked tutorials. ■

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RESOURCES:

Alpha Books
201 West 103rd St.
Indianapolis, IN 46290

Que
PTR Prentice Hall
113 Sylvan Ave.,
Route 9W
Englewood, NJ 07632

Davidson & Associates, Inc.
P.O. Box 2961
Torrance, CA 90509
1-800-545-7677

Dynamix, Inc.
1600 Millrace Dr.
Eugene, OR 97403
(503)343-0772

Living Books, A Random House/Brøderbund Co.
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(415)382-4400

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- 4MB RAM exp to 32MB
- 8K Internal Cache
- Shadow RAM

Landmark speed: 111/90

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ISA BUS
486SX40 386DX40 NO CACHE/ 128K CACHE Complete Systems

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VGA 1024x768, 512K	35
VGA 1024x768, 1MB	55
VGA 1024x768, 1MB w/Windows Accelerator	59
Kelvin VLB VGA 1280x1024, 1MB	128
Diamond Stealth 64 PCI/VLB	128
ATI PCI VLB w/Local Bus	115
Upgrade to 2MB	59

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IDE (ISA)	$10
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w/16550	45
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1.44 Floppy Diskette	30¢

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Logitech Mouseman (OEM)	35
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HP 560C	485

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Sony/Mitsumi/Panasonic	$120
4X CD-ROM	
Mitsumi	216
Teac 55A	230
2X CD-ROM (SCSI)	
Chinon CDS 535	225
Sound Blaster 16	80
Sound Blaster 16 MCD	90
Sound Blaster 16 MCD Compatible	65
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4W/40W/80W	$10/30/55
CD Games	$5.99
Compton's Encyclopedia '95	20
Microsoft Encarta '95	39

KEYBOARDS

101 Enhanced	$15
Maxiswitch/Keytronic	25

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960/2400 Fax/Modem	$35
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14.4 Fax/Modem (ext)	70
28.8K Fax/Modem	169

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486DX2-80 (AMD)	279
486DX4-100 (AMD)	355
486DX2-66 (Intel)	275
486DX4-100 (Intel)	475
Pentium 60/66	575/675
Pentium 90	895
Pentium 90 (Sis/Opti)	855/855
Pentium 90 (Intel/Micronics)	920/999
Micronics Motherboard	CALL

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250 MB Colorado	$155
120 MB/250 MB Tape	15

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SCSI DRIVES

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540MB	245
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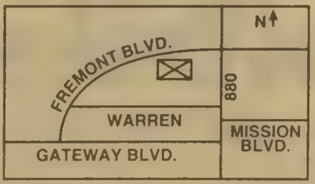

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540MB IDE	QM30540MVA	14ms	3.5"x1"	$225
540MB SCSI	QM30540MVS	14ms	3.5"x1"	$228

LIGHTNING IDE & SCSI-2 SERIES

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540MB IDE	QM30540LTA	11ms	3.5"x1"	$235
730MB IDE	QM30730LTA	11ms	3.5"x1"	$269
365MB SCSI	QM30365LTS	11ms	3.5"x1"	$179
540MB SCSI	QM30540LTS	11ms	3.5"x1"	$239
730MB SCSI	QM30730LTS	11ms	3.5"x1"	$279

ProDrive IDE & SCSI-2 SERIES				Internal	External
540MB	LPS540AT	12ms	3.5"x1"	$279	$N/A
540MB	LPS540S	12ms	3.5"x1"	$299	$399

EMPIRE FAST SCSI-2 SERIES				Internal	External
1.0GB	EMP1080S	9.5ms	3.5"x1"	$539	$639
1.4GB	EMP1400S	8.9ms	3.5"x1"	$729	$839
2.1GB	EMP2100S	8.9ms	3.5"	$899	$999

Maxtor

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420MB	7420AV	12ms	3.5"x1"	$185
540MB	7540AV	12ms	3.5"x1"	$229
540MB	MXT540A	8.5ms	3.5"x1"	$Call
546MB	7546A	12ms	3.5"x1"	$239
850MB	**7850A**	**12ms**	**3.5"x1"**	**$345**
1.2GB	**71260A**	**<12ms**	**3.5"x1"**	**$499**

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540MB	CFA540A	12ms	3.5"x1"	$229
850MB	CFA850A	<12ms	3.5"x1"	$275
1.27GB	CFA1275A	12ms	3.5"x1"	$419

FAST SCSI-2 DRIVES				Internal	External
1.0GB	CFP1060S	<12ms	3.5"x1"	$489	$599
2.1GB	CFP2105S	<9ms	**5400RPM**	$925	$1029
2.1GB	CFP2107S	<9ms	**7200RPM**	$1065	$1169
4.2GB	CFP4207S	<9ms	**7200RPM**	$2139	$2249

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850MB	WDAC2850	<10ms	3.5"x1"	$309
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1.0GB	94G3183	12ms	3.5"x1"	$459

FAST SCSI-2DRIVES				Internal	External
540MB	94G2646	12ms	3.5"x1"	$239	$339
728MB	94G2647	12ms	3.5"x1"	$329	$429
1.0GB	94G3184	10.5ms	3.5"x1"	$529	$629
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2.0GB	MC4221	8.5ms	3.5"x1"	$1059	$1169
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4.0GB	MC3243	8.5ms	3.5"	$1999	$2099
9.1GB	MC1991	11ms	5.25"	**$3199**	$3399

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2.0GB	MC4221AV	8.5ms	3.5"x1"	$1209	$1299
3.0GB	MC1936AV	11ms	5.25"	$1349	$1549
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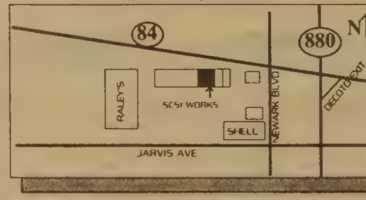

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200MB (SQ5200C) SCSI KIT INT/EXT	**$545/$599**

SyQuest *Cartridges*

			1pc/5pk
SQ400	**44MB**	**5.25"**	**$59/285**
SQ800	**88MB**	**5.25"**	**$69/340**
SQ310	**105MB**	**3.5"**	**$58/280**
SQ2000	**200MB**	**5.25"**	**$82/399**
SQ327	**270MB**	**3.5"**	**$65/315**

Maxoptix

1.3GB Rewritable Optical Drives

Tahiti-3M *1MB* Cache buffer INT/EXT	$1979/$2169
Tahiti-3M *4MB* Cache buffer INT/EXT	$2149/$2349
1.3GB Cart Glass / Poly (512 or 1024b Sector)	$189/$149

HEWLETT PACKARD *Rewritable Optical Drives*

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C2550A	1.3GB 5.25" External	$2149
C1100A	20GB Ext Juke Box (20XT)	$4589
1.2GB(1024b/s) or 1.3GB(512b/s) cartridge		$109

FUJITSU

***DynaMO* 2512A 230MB 3.5" Optical.**

Internal/External(with cart)	$699/$839
EXTERNAL w/16 Bit Adapter & Cart for PC	$969

RICOH

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RO3012E	128MB 3.5" INT/EXT	$499/$599
RO5061	1.3GB 5.25" HH INT/EXT	$1699/$1999

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1.44MB	**TEAC** 3.5" FloppyDrivew/Bkt	$40/45
1.2/1.44MB	**TEAC** Dual Floppy drive	$96
2.88MB	**TEAC** 3.5" FloppyDrivew/Bkt	$89/94
1.2MB	**EPSON** Floppy Drive 5.25"	$43
1.44MB	**EPSON** Floppy Drive 3.5" w/Bkt	$36/41
1.2/1.44MB	**EPSON** Dual Floppy Drive	$89

TAPES & CARTRIDGES

4mm DAT		Ea./5Pak
Exabyte/HP	90 Meter	$20/$90
Maxell/3M/Sony	90 Meter	$15/$65
Fuji-DG90M	90 Meter	$13/$55
Sony/HP	120 Meter (DDS-2)	$29/$139
4mm Cleaning	Cartridge	$20/$95

8mm Data Carts		Ea./5Pak
Exabyte	112 Meter up to 5GB	$19/$90
Exabyte	160 Meter XL up to 7GB	$29/$140

Mini Data Carts NEW!

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CMS	350MB Kit w/DT-350 Tape	$49/$235
Sony	QIC-WIDE QW5122F up to 420MB	$20/$95
Sony	QIC-WIDE QW3010XLF up to 850MB	$26/$125
Sony	QIC-WIDE QW3080XLF up to 4GB	$33/$160
3M	DC2750/MC3000 (750MB)	$28/$135
EXABYTE	DC2750/MC3000 (750MB)	$30/$145
EXABYTE	MC3000XL (1GB)	$39/$190
3M	MC3000XL (1GB)	$35/$168
Sony	QD2120 QIC80 up to 250MB	$22/$105
Sony	QD2120 unformatted up to 250MB	$19/$90
3M	DC2120 Ximat up 250MB	$17/$79
3M	DC2120XL Ximat up 350MB	$25/$120
Maxell	DC-2120 unformatted tapes	$15/$69
Maxell	DC-2120 QIC 80 formatted	$18/$85
Maxell	2120 Cleaning Kit	$22/$100
GIGATEK	DC2120 QIC80 up to 250MB	$15/$69
GIGATEK	DC2120XL up to 350MB	$22/$104

1/4" Data Carts		Ea./5Pak
Sony	QD6150 - 150MB	$17/$79
Sony	QD6250 - 250 MB	$23/$104
Sony	QD6525 - 525 MB	$29/$140
3M/Maxell	DC6150 - 150MB	$16/$75
3M/Maxell	DC6250 - 250MB	$22/$99
3M/Maxell	DC6525 - 525MB	$28/$135
GIGATEK	DC6150 - 150MB	$14/$65
GIGATEK	DC6250 - 250MB	$19/$90
GIGATEK	DC6525 - 525MB	$24/$109
3M	Magnus 1.2 - 1.2 GB	$45/$215
3M	Magnus 2.0 - 2.0 GB	$59/$285
GIGATEK	DC9120 - 1.2GB	$45/$215
GIGATEK	DC9200 - 2.0GB	$59/$285
Maxell	DC-9135 - 1.3 GB	$49/$235

3.5" Optical Carts		Ea./5Pack
3M/Ricoh	128MB 512 bytes/sec	$39/$190
Verbatim/Maxell	230MB 512 bytes/sec	$47/$219
FUJITSU	230MB 512 bytes/sec	$55/$265

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28.8	INT/EXT for PC - **V.34** w/V.42	$229/$239

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28.8	INT/EXT for PC V.34-V.FC-V.42	$389/$429
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DB-50 to DB-50 3ft	$39.99
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Centronics 50Terminator Single/Dual End	$9/13
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XP17	17" 1280x1024/.28dpi Opticlear	$1269
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VIDEO CARDS

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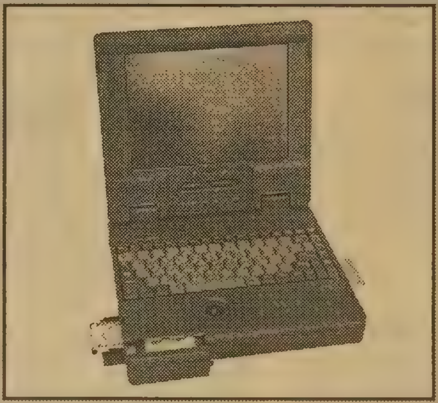

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- 8.15 Lbs

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DUAL SCAN	PENTIUM 66	$2390	$2449	$2615
ACTIVE SCAN	PENTIUM 66	3219	3269	3445
DUAL SCAN	PENTIUM 90	3199	3249	3559
ACTIVE SCAN	PENTIUM 90	4549	4595	4915

ACCESSORIES:

8MB RAM	$395
16 MB RAM	775
32 MB RAM	1495
PCMCIA Fax 14.4/14.4	159
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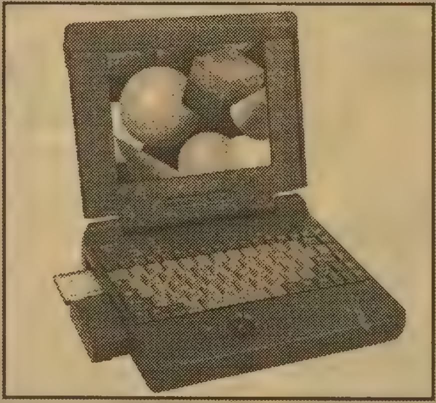

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- 1 Parallel/1 Serial Port
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- Docking Station Option
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486DX2-66	1319	1799	2695
486DX4-100	1539	2029	2899

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N-METAL Battery	135
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PCMCIA Fax Modem 14.4/14.4	199
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- 101 Enhanced Keyboard
- Mid Tower Case w/230W PS

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486DX2-66 MHz AMD	$890
486DX-33 MHz Intel	$885
486DX-40 MHz AMD	$820

- 256K Cache
- 4 MB RAM Expandable to 32 MB
- 1.44 MB Floppy Drives
- 420 MB IDE Hard Drive
- Vesa Local Bus 32 Bit IDE Cont 2H/2F I/O with 2 Serial, 1 Parallel, 1 Game
- VESA Local Bus SVGA Card w/1 MB RAM
- 14" SVGA .28dp Monitor
- 101 Enhanced Keyboard
- Mini Tower Case w/230W PS
- Serial Mouse

POWERFUL
Pentium EISA PCI *System*

Pentium 90 MHz
$3299

- Intel Pentium 90 MHz Processor
- Dual Pentium Processor Option
- EISA PCI Motherboard Expandable to 512K Cache
- 16 MB RAM Expandable to 128 MB
- 1.44 MB Floppy Drive
- 1.0 GB SCSI Hard Drive
- Adaptec 2940 PCI SCSI Controller
- I/O Card w/2S/1P
- ATI Ultra Turbo 64 Bit PCI w/2 MB VRAM Video Card
- 15" CTX SVGA Non-Interlaced Monitor (1280x1024) .28dp
- 101 Enhanced Keyboard
- Full Tower Case w/ 250W Power Supply
- 3 Button Serial Mouse

Options:

2nd Pentium 90 Mhz CPU:	+$620
1 GB SCSI Tape Back-Up:	+$525
ATI Ultra Turbo 64 Bit PCI w/4MB:	+$199

HOT!!!
Pentium + PCI Systems

PENTIUM PCI 60	$1559
PENTIUM PCI 66	$1599
PENTIUM PCI 90	$1759

- Intel Pentium Processor
- 256K Cache
- 8 MB RAM Expandable to 128 MB
- 16KB Internal Pentium Cache
- 1.44 MB Floppy Drives
- 420 MB IDE Hard Drive
- PCI IDE Controller w/UART 16550 Card
- I/O with 2 Serial, 1 Parallel, 1 Game
- PCI Orchid Kelvin w/1 MB Video Card
- 14" SVGA .28dp NI Color Monitor
- 101 Enhanced Keyboard
- Mid Tower Case w/250 W PS

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Impression 14" .39/.28	$180/200
Impression 14" .28 NI	210
Impression 7 17"	580
GVC 14" .28 Low Radiation	205
CTX 15" .28 NI	299
ADI 15" 4GP	348
ADI 17" 5EP .28	595
ViewSonic 15 NI 1280x1024	405
ViewSonic 15E 15" 1024x768	348
ViewSonic 17" 1600x1280	810
ViewSonic 17G 1280x1024	690
Sony 15 5F	419
Sony 17 5E1600x1200	902
Mag DX15/17	345/615
Mag MX15/17	454/780

DISPLAY CARDS

ATI Ultra Win Turbo 64 PCI/4 MB	$478
ATI Ultra Win Turbo PCI/VLB 2 MB	258
Orchid Kelvin 64 VLB/PCI 1 MB	125
Orchid Kelvin 64 VLB/PCI 2 MB	171
Diamond Stealth 64 PCI/VLB 4 MB VRAM	417
Diamond Stealth 64 PCI/VLB 2 MB VRAM	280
Diamond Stealth PCI/ 1 MB DRAM	125
Diamond Stealth PCI/2 MB DRAM	178
Cirrus Logic 5428 VLB/1 MB 2 MB	75/112
Cirrus Logic 5434 PCI/1 MB	88

Call For More
FOR CPU'S PLEASE CALL

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1.0 GB IDE/SCSI	415/480
2.1 GB SCSI	890

MODEMS/TAPE BACK-UPS

14.4/14.4 Int/Ext	$67/105
28.8/28.8 Int/Ext	106/139
250 MB Tape Back-Up	135
3M #2120 Tape	10

MOTHERBOARDS

486SX/DX-25/33/50/66	$85
486SX/DX-25/33/50/66 PCI	148
Intel Pentium MB For 90	297

FLOPPY DRIVES

1.44 MB (3.5") FDD	$29
1.2 MB (5.25") FDD	40

MOUSE

3 Button Serial	$8
Microsoft Serial	24
Logitech First Mouse	28

CONTROLLER CARDS

32 Bit 2940 SCSI Card	$195
32 Bit 2940W SCSI Card	239

MULTIMEDIA CD-ROMS

Sony 55E Double Speed	$119
Toshiba 4X SCSI	285
NEC Triple Speed	225
Mitsumi 4X IDE	209
Teac 4X IDE	209
Plextor 4X SCSI	395

SOUND CARDS

Creative Lab 16	$78
Creative Labs 16 w/ASP	115
Creative Labs 16 SCSI	108
Creative Labs 16 SCSI w/ASP	155
Creative Labs 32 AWE	257
Creative Labs Discover	240
Creative Labs Edutainment	393

MULTIMEDIA UPGRADE KITS

Diamond 2X Kit-1000	$325
Diamond 4X Kit-5000	485

CALL FOR OTHER ITEMS NOT LISTED

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1) SONY Dual Speed CD-ROM Sound Blaster 16 Bit With Items Below
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2) NEC Triple Speed CD-ROM (SCSI)Sound Blaster 16 Bit SCSI With Items Below
$390

3) TOSHIBA Quad Speed Sound Blaster 16 Bit SCSI With Items Below
$460

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- Microsoft CD Titles Kit Including:
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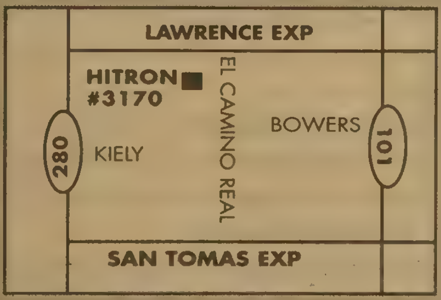
  - Works
  - Money
  - Golf
  - Complete Baseball
  - Entertainment Pack w/7 Titles



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Resources

Calendar Of Events

Conferences, Shows, Special Events

February

February 4 Computer Products Show And Sale. Sonoma County Fairgrounds, Santa Rosa. MarketPro. Call: (415)456-6730.

February 5 Computer, Ham Radio, Electronics Swap Meet. Las Positas College, Livermore. Livermore Amateur Radio Club. Call: (510)783-2803 days, 447-3857 eves.

February 5 Computer Products Show And Sale. Embassy Suites, San Rafael. MarketPro. Call: (415)456-6730.

February 6 How To Build Motivated And Productive Work-Teams Workshop. San Francisco. National Seminars Group. Call: 1-800-258-7246.

February 6–9 Intermedia '95 Conference And Expo. San Francisco. Intermedia. Call: (203)840-5634.

February 7 CASE InfoModeler Data Modeling Tool Demo. San Jose. Software Technology Group. Call: Wally Brooks, (408)441-9874.

February 7 How To Build Motivated And Productive Work-Teams Workshop. Oakland. National Seminars Group. Call: 1-800-258-7246.

February 8 How To Build Motivated And Productive Work-Teams Workshop. Concord. National Seminars Group. Call: 1-800-258-7246.

February 9 How To Build Motivated And Productive Work-Teams Workshop. San Jose. National Seminars Group. Call: 1-800-258-7246.

February 10 How To Build Motivated And Productive Work-Teams Workshop. Palo Alto. National Seminars Group. Call: 1-800-258-7246.

February 12 Computer Products Show And Sale. Civic Auditorium, Stockton. MarketPro. Call: (415)456-6730.

February 12 Computer Show And Sale Expo. Santa Clara County Fairgrounds, San Jose. Bonanza Show Productions. Call: Joe, (415)595-1053.

February 13–14 Managing Software Development Conference. San Francisco. Miller Freeman, Inc. Call: (415)905-2784.

February 14–16 Software Development '95 West Production Expo. San Francisco. Miller Freeman, Inc. Call: (415)905-2784.

February 14–17 Client/Server Conference And Expo. San Jose. CMP Trade Show & Conference Services. Call: 1-800-808-EXPO.

February 15–16 Globalizing Software Conference. San Francisco. Miller Freeman, Inc. Call: (415)905-2784.

February 15–17 Enterprise Application Development Conference. San Francisco. Miller Freeman, Inc. Call: (415)905-2784.

February 15–17 Software Development Conference. San Francisco. Miller Freeman, Inc. Call: (415)905-2784.

February 19 Computer Products Show And Sale. Scottish Rite Center, Sacramento. MarketPro. Call: (415)456-6730.

February 19 Computer Show And Sale Expo. Alameda County Fairgrounds, Pleasanton. Bonanza Show Productions. Call: Joe, (415)595-1053.

February 25–26 Computer Products Show And Sale. Solano County Fairgrounds, Vallejo. MarketPro. Call: (415)456-6730.

February 27 Understanding And Exploiting Groupware And Lotus Notes Seminar. San Francisco. DCI. Call: (508)470-3880.

February 27–March 1 High Tech Direct 2000 Conference And Expo. Santa Clara. CMP Trade Show & Conference Services. Call: 1-800-808-EXPO.

February 28–March 1 Successful Notes Deployment Strategies Seminar. San Francisco. DCI. Call: (508)470-3880.

MARCH 5–9

COMPCON '95: Information Superhighway Technologies

STANFORD COURT HOTEL, SAN FRANCISCO

COMPCON '95 is the premier professional conference on information superhighway technologies and applications. It is sponsored by the IEEE Computer Society. There are no exhibits: this is a no-nonsense technical conference for computer science and engineering professionals who are interested in sharing and learning more about the rapidly growing information superhighway business. Besides three days of ninety technical sessions, there are nine tutorials in relevant subjects. Some of the keynote speakers at COMPCON '95 will be Dave Farber, professor at the University of Pennsylvania; Jim Clark, CEO of Netscape; Steve Schramm, VP of engineering at General Magic; and Andy Lippman, professor at MIT. For more information email: egrimes@aol.com or fax: (408)973-1325.

MARCH 14–18

Technology And Persons With Disabilities Conference

LOS ANGELES AIRPORT MARRIOTT AND AIRPORT HILTON

The Tenth Annual International Technology and Persons With Disabilities Conference will cover all aspects of disabilities and feature an internationally recognized faculty. It includes twenty-two practical how-to preconference sessions; a keynote address by Deborah Kaplan, a task force member of the National Information Infrastructure; a special mini-conference on the Electronic Superhighway; a limited number of scholarships for parents of disabled children and persons with disabilities through grants from Pacific Telesis Foundation and CSUN; more than 130 exhibit stations within 23,000 square feet of exhibit space; more than 210 one-hour and half-hour general session presentations; new product announcements; and special conference sessions on "State Tech Act Grant" issues. For more info call (818)885-2578 (voice, TDD, message), fax (818)885-4929, or email ltm@csun.edu .

March

March 1 Live Internet Interview With Sven Birkerts, Author Of *The Gutenberg Elegies: The Fate Of Reading In An Electronic Age*. Internet Relay Chat. Internet Roundtable Society. Email: *IRinfo@fununiv.com; WWW: http://www.IRsociety.com;* Gopher: *gopher.IRsociety.com* .

March 4 Computer Show And Sale Expo. San Mateo Expo Center. Bonanza Show Productions. Call: Joe, (415)595-1053.

March 4–5 Computer Products Show And Sale. Cal Expo, Sacramento. MarketPro. Call: (415)456-6730.

March 5 Computer, Ham Radio, Electronics Swap Meet. Las Positas College, Livermore. Livermore Amateur Radio Club. Call: (510)783-2803 days, 447-3857 eves.

March 5–9 COMPCON '95: Information Superhighway Technologies Conference. San Francisco. IEEE Computer Society. Email: egrimes@aol.com, fax: (408)973-1325.

March 7–9 Documation '95 Conference And Expo. Long Beach. Graphic Communications Association. Call: Marion Elledge, (703)519-8193 (conf.) or Kathleen Kaiser (805)984-4364 (expo.).

March 11 Computer Products Show And Sale. Sonoma County Fairgrounds, Santa Rosa. MarketPro. Call: (415)456-6730.

March 14–18 Technology And Persons With Disabilities Conference. Los Angeles. Center on Disabilities. Call: (818)885-2578, email *ltm@csun.edu* .

March 18–19 Computer Products Show And Sale. Solano County Fairgrounds, Vallejo. MarketPro. Call: (415)456-6730.

March 20–21 Finkelstein's Nuts And Bolts Of Client/Server Computing Seminar. San Francisco. DCI. Call: (508)470-3880.

March 20–24 PCB Design Conference. Santa Clara. Miller Freeman, Inc. Call: Yolanda White, (415)905-4994.

March 28 How To Build Motivated And Productive Work-Teams Workshop. Monterey. National Seminars Group. Call: 1-800-258-7246.

March 30 How To Build Motivated And Productive Work-Teams Workshop. Modesto. National Seminars Group. Call: 1-800-258-7246.

March 31 How To Build Motivated And Productive Work-Teams Workshop. Sacramento. National Seminars Group. Call: 1-800-258-7246.

Classes, Seminars, Workshops

February

February 4 Intro To The Internet Class. Kentfield. Internet Literacy Consultants. Call: (415)485-9412.

February 5 Internet 101: An Introduction For Beginners And The Curious Class. San Francisco. Internet Literacy Consultants. Call: (415)469-8271 or email *info@matisse.net*.

February 6 Complete Online Novell CNA Training. Berkeley. Cyber State University. Call: (510)253-TREK.

February 6–7 MS Word Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 6–8 Avid: Intro To Media Composer Class. San Francisco. Bay Area Video Coalition. Call: (415)861-3282.

February 6–8 Novell 3.12 System Manager Class. Oakland. California Computer Options. Call: (510)444-5700 ext. 188.

February 6–9 Professional AutoCAD Level 1 Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 7 Intro To TCP/IP Seminar. Computer College Silicon Valley. Call: (415)325-3648.

February 7 MAS 90 Accounting Software Training Class For Beginners. San Francisco. Lindquist & Lukrich Consulting. Call: (415)905-6900.

February 7 Modems, Modems, Modems Seminar. Computer College Silicon Valley. Call: (415)325-3648.

February 7 Using Windows For Workgroups And Windows NT Client/Server Seminar. San Francisco. Network Services Group. Call: (415)863-8407.

February 7 What's New On The Internet Seminar. Computer College Silicon Valley. Call: (415)325-3648.

February 7–8 Supporting And Troubleshooting OS/2 Seminar. San Jose. Data-Tech Institute. Call: (201)478-5400.

February 7–8 Understanding TCP/IP Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 7–March 28 Intro To Interactive Multimedia Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

February 7–April 11 Product Marketing For Data Communications And Networking Class. Atherton. UC Berkeley Extension. Call: (510)642-4151.

February 8 Intro To The WELL, Beyond The Menus Class. San Francisco. The WELL. Call: (415)615-7900.

February 8 PowerPoint 4.0 For Windows/Mac Level 1 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808 ext. 209.

February 8 Software Licensing Agreements Workshop. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 8 Web Pages And Web Servers Seminar. Computer College Silicon Valley. Call: (415)325-3648.

February 8–9 MS PowerPoint Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 9 IBM PC Clone Hands-On Hardware Class. Oakland. Excel Micro Solutions. Call: (510)836-2040.

February 9 Lotus 1-2-3 4.0 For DOS/Windows Level 1 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808 ext. 209.

February 9 Love And War In CyberSpace Seminar. Menlo Park. Virtual Valley. Call: Cleopatra Alfenito, (415)824-2536.

February 9 MAS 90 Accounting Software Training Class For Intermediates. San Francisco. Lindquist & Lukrich Consulting. Call: (415)905-6900.

February 9 Wireless Data Communications Seminar. Computer College Silicon Valley. Call: (415)325-3648.

February 9–10 Banyan Vines Beyond Mail Class. Oakland. California Computer Options. Call: (510)444-5700 ext. 8.

February 9–10 Improving The Software Testing Process Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 9–10 Understanding Client/Server Computing Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 9–10 Understanding LANs Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 9–April 20 Software Product Marketing Class. Belmont. UC Berkeley Extension. Call: (510)642-4151.

February 9–May 4 UNIX Kernel Internals Class. Berkeley. UC Berkeley Extension. Call: (510)642-4111.

February 10 CorelDRAW 5.0 Update Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 10 Networking For Dummies Seminar. Emeryville. Network Computing.

Call: (510)568-8007.

February 11 Intro To Data Communications And Transmission Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

February 11 Searching The Internet Class. Kentfield. Internet Literacy Consultants. Call: (415)485-9412.

February 11–12 Digital Editing With QuickTime Class. San Francisco. Bay Area Video Coalition. Call: (415)861-3282.

February 11–18 MacroModel Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 12 CCnet Class. San Francisco. Internet Literacy Consultants. Call: (415)469-8271 or email *info@matisse.net*.

February 12 Intro To The WELL, Beyond The Menus Class. Corte Madera. The WELL. Call: (415)615-7900.

February 13 Complete Online Novell CNE Training. Berkeley. Cyber State University. Call: (510)253-TREK.

February 13–14 AutoCAD R12 Update Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 13–14 MS Excel Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 13–14 Networking The Macintosh Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 13 & 20 Understanding Adobe Photoshop Seminar. Pleasant Hill. Contra Costa County Office of Education. Call: Daniel Pesavento, (510)943-8332.

February 14 Benefits Of Local Area Networks Seminar. San Francisco. Network Services Group. Call: (415)863-8407.

February 14 Coaching And Teambuilding Skills Workshop. Santa Rosa SkillPath, Inc. Call: 1-800-873-7545.

February 14–15 Fundamentals Of Data Communications And LANs Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 14–March 14 3D Studio 2 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 14–March 14 Getting Started With Director For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

February 14–April 4 Electronic Music And Interactive Multimedia Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

February 15 Coaching And Teambuilding Skills Workshop. Oakland. SkillPath, Inc. Call: 1-800-873-7545.

February 15 Hands-On Training Internet Tools Kit Workshop. San Francisco. The WELL. Call: (415)615-7900.

February 15 How To Build Your Own Windows For Workgroups Computer Network. El Cerrito. Network Magicians. Call: (510)528-9895.

February 15–16 AutoCAD R13 Update Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 15–16 Fundamentals Of T1/T3 Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

February 15–16 MS Access Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 15–March 1 Adobe Illustrator Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 16 Coaching And Teambuilding Skills Workshop. San Francisco. SkillPath, Inc. Call: 1-800-873-7545.

February 16–17 PC Repair Two-Day Hands-On Class. Oakland. Excel Micro Solutions. (510)836-2040.

February 16–17 T1/T3/SONET Networking Seminar. San Jose. Data-Tech Institute. Call: (201)478-5400.

February 18 CNE Hands-On Study Group With Remote Access. Oakland. Excel Micro Solutions. (510)836-2040.

February 20 Complete Online Novell CNA Training. Berkeley. Cyber State University. Call: (510)253-TREK.

February 20 Complete Online Novell CNE Training. Berkeley. Cyber State University. Call: (510)253-TREK.

February 20–21 Network Fundamentals Hands-On Class. Oakland. Excel Micro Solutions. (510)836-2040.

February 20–March 3 Interactive Multimedia Intensive Workshop. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 20–March 27 Managing Your Mac Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 21 Managing Local Area Networks Seminar. San Francisco. Network Services Group. Call: (415)863-8407.

February 21–March 14 Interactive Authoring: Lingo 2 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 22 Desktop Publishing With MS Publisher Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

February 22 Fundamental AutoCAD Designer Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 22 Hands-On TeleMagic Training For DOS And Windows Class. San Jose. SofTel Training & Consulting. Call: (408)926-0885.

February 22 Hands-On Training Internet Tools Kit Workshop. San Francisco. The WELL. Call: (415)615-7900.

February 22–23 AutoCAD Designer Workshop. Santa Clara. The Copper Connection. Call: (408)970-9838.

February 22–23 Telecommunications Technologies For The Non-Engineering Professional Seminar. San Jose. Data-Tech Institute. Call: (201)478-5400.

February 22–24 Autodesk Animator Pro Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

February 22–24 Avid: Intro To Media Composer Class. San Francisco. Bay Area Video Coalition. Call: (415)861-3282.

February 22–24 Banyan Vines Administration Class. Oakland. California Computer Options. Call: (510)444-5700 ext. 8.

February 22–May 3 Amateur Radio Code And Theory For Novice And Technician Licenses Class. Pleasanton Library. Livermore Amateur Radio Klub. Call: Chuck Thompson, (510)606-6074; or Clancy Soucie, (510)462-8946.

February 23 Graphics Presentation With PowerPoint Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

February 23 & 25 Intro To Multimedia In Education Class. San Francisco. SFSU

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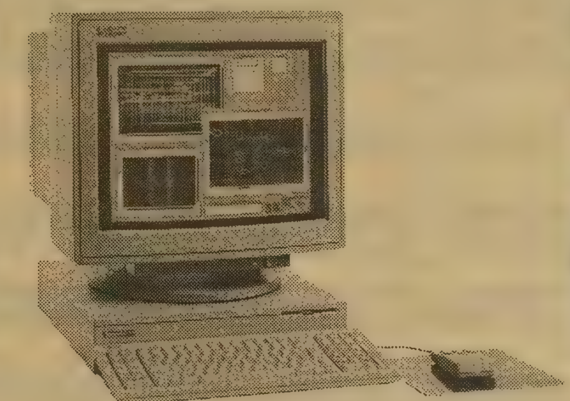

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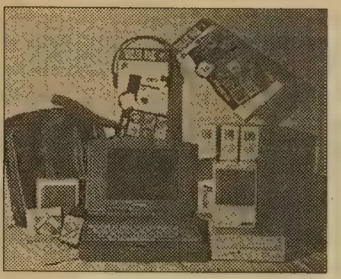

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Prime Time Texcetera	55
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InfoMagic Source Code(4.3 BSD,MACH,GNU)	19
InfoMagic UNIX(386BSD,NetBSD,FreeBSD)	19
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SunSoft (Interactive) UNIX:

Interactive UNIX/386 Base Solution (2 User)	$300
Interactive UNIX/386 Network Solution (2 User)	695
Interactive UNIX/386 Graphics Solution (2 User, Tape)	895
Interactive UNIX/386 Software Development System	555
Solaris 2.4 Desktop for x86	490
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UnixWare Server Merge for Windows	290
UnixWare NFS	155
UnixWare C2 Auditing	155
UnixWare On Line Data Manager	1755
* UnixWare Personal Edition + SDK	245
XFree 86 210 For UnixWare	20

Networking

Netware 3.12 (5/10/50)	$625/1475/2600
Netware 4.0 (5/10/50)	825/1875/3175
Personal Netware Starter Kit (2 Nodes, 2 NE2000,2 Software Kit)	135
NE-2000 Compatible 16-bit Ethernet Card Combo (Novell Certified)	40
10 BaseT 8 Port Hub	135
10 BaseT 16 Port Hub	279
SMC 16-bit (Coax/10BaseT)	105
SMC/NE2000 16-bit Compatible	70
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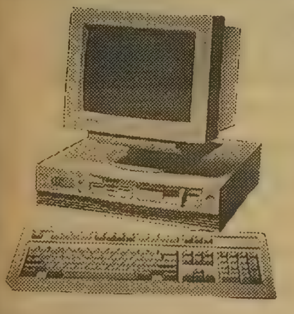

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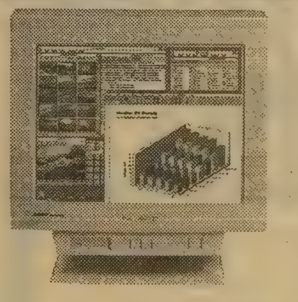

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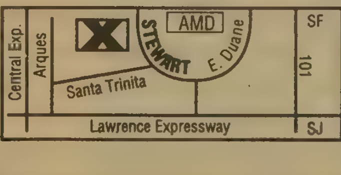

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486DX40C VLB	169	329	569	609	729	839	899	979	1,339
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486DX50C ISA	209	389	609	649	769	879	939	1,019	1,379
486DX2-50C ISA	159	319	559	599	719	829	889	969	1,329
486DX40C ISA	159	319	559	599	719	829	889	969	1,329
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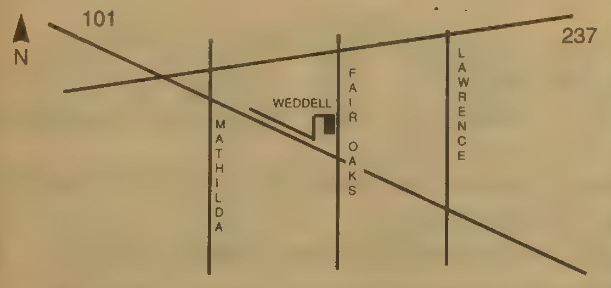

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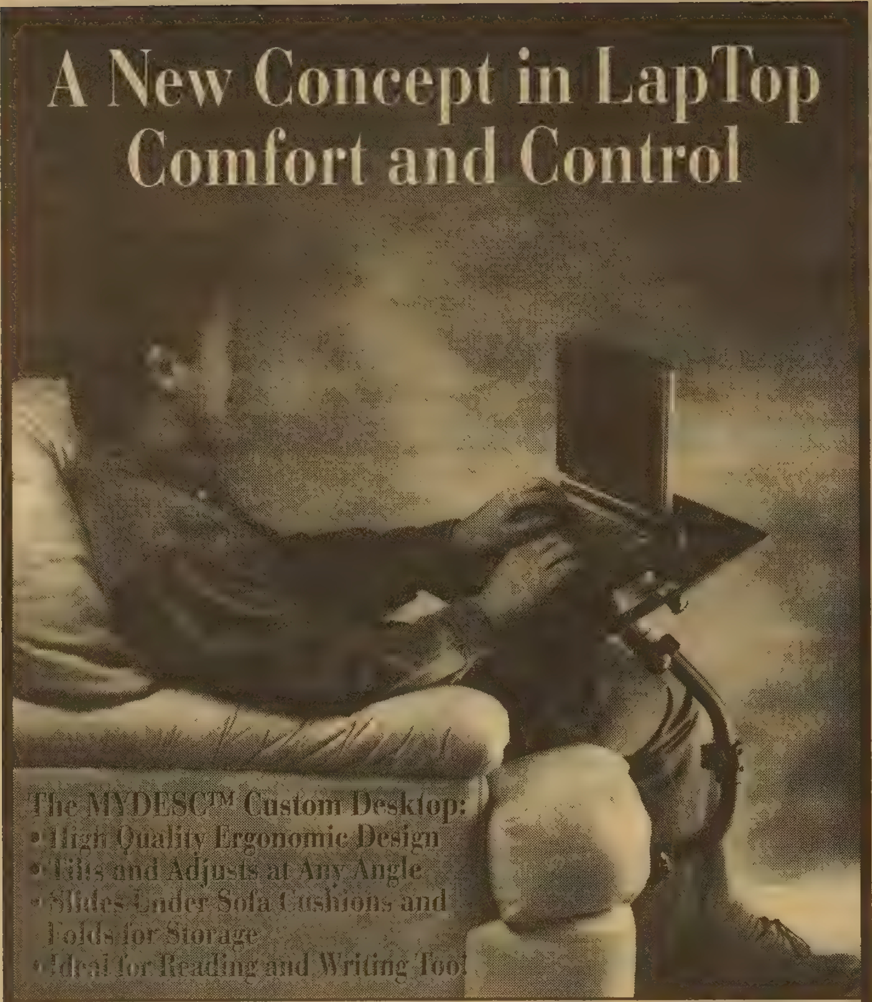
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March 27–28 Novell System Supervisor 3.12 Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808 ext. 209.

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March 30–May 25 Graphics And Human Interface For Multimedia On The PC Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

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April 5–May 24 Law For Multimedia Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

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- 101 Keyboard
- Hi-Res mouse w/Mouse Pad
- Motherboard Made in USA by IBM

SLC2-66 ....$882

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AT I/O w/2S/16550) 1P	29
IDE VLB w/2S (16550) 1P,1G	45
SCSI VLB (Adaptec Chipset)	85
SCSI 16 Bit Sound Card	85

ECI Multimedia 486dx2-80/DX4-100 AMD VLB Systems

- AMD 486 CPU
- 256K External Cache
- 4MB RAM, Expandable to 128 MB (72 Pin)
- 1.2 & 1.44 MB Floppy Drive
- 540MB IDE Hard Drive
- VLB IDE Controller w/2S, 1P, 1G Ports
- 32-Bit VLB SVGA Graphics Accelerator Card w/1MB
- Pentium OverDrive Ready with on board ZIF Socket
- Mini-Tower Case w/230W Power Supply
- 14" SVGA Color Monitor, 1024x768, .28dp, NI
- Double Speed CD-ROM Drive
- 16-Bit Sound Card w/CD Interface
- MultiMedia Speakers
- 3 CD Titles:

-Family Health Book
-Compton's Interactive Encyclopedia
-Return to Zork

- 101 Keyboard
- Hi-Res mouse w/Mouse Pad

DX2-80...............$1329

ECI 486 DX2-66/DX4-100 Intel VLB Systems

- Intel 486 CPU
- 256K External Cache
- 4MB RAM, Expandable to 128 MB (72 Pin)
- 1.2 & 1.44 MB Floppy Drive
- 540MB IDE Hard Drive
- VLB IDE Controller w/2S, 1P, 1G Ports
- 32-Bit VLB SVGA Graphics Accelerator Card w/1MB
- Pentium OverDrive Ready with on board ZIF Socket
- Mini-Tower Case w/230W Power Supply
- 14" SVGA Color Monitor, 1024x768, .28dp, NI
- 101 Keyboard
- Hi-Res mouse w/Mouse Pad

DX2-66 ....$1095

DX4-100.............$1279

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Keytronic 101 Key	25
ECI 101 Key	19
Enhanced 102 Key	59
Focus 9000 129 Key	59
Focus 2001 Click 101 Key	39
Proxellent 121 Key (Programmable)	75

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- 1.2 & 1.44 MB Floppy Disk Drives
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- 101 Keyboard
- Hi-Res Mouse w/Mouse Pad

Pentium 90 MHz...$2195

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- 16-Bit Sound Card w/CD Interface
- Multimedia Speakers
- 3 CD Titles:

-Family Health Book
-Compton's Interactive Encyclopedia
-Return to Zork

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- Intel 486 CPU
- 256K External Cache
- 4MB RAM, Expandable to 128 MB (72 Pin)
- 1.2 & 1.44 MB Floppy Drive
- 540MB IDE Hard Drive
- VLB IDE Controller w/2S, 1P, 1G Ports
- 32-Bit VLB SVGA Graphics Accelerator Card w/1MB
- Pentium OverDrive Ready with on board ZIF Socket
- Mini-Tower Case w/230W Power Supply
- 14" SVGA Color Monitor, 1024x768, .28dp, NI
- Quad Speed CD-ROM Drive
- 16-Bit Sound Card w/CD Interface
- MultiMedia Speakers
- 3 CD Titles:

-Family Health Book
-Compton's Interactive Encyclopedia
-Return to Zork

- 101 Keyboard
- Hi-Res mouse w/Mouse Pad

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- 850MB IDE Hard Disk Drive
- PCI IDE Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- ATI Graphic Plus 32 PCI w/2MB DRAM
- Full-Tower Case w/250W Power Supply
- 15" SVGA Color Monitor, 1280x1024, .28dp, NI
- 101 Keyboard
- Hi-Res Mouse w/Mouse Pad

Pentium 60 MHz.......$1895

Pentium 66 MHz.......$1939

Multimedia Upgrade for ECI Pentiums:

- Quad Speed CD-ROM Drive
- 16-Bit Sound Card w/CD Interface
- Multimedia Speakers
- 3 CD Titles:

-Family Health Book
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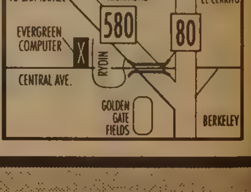

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BT757S Fast Wide SCSI Card	369
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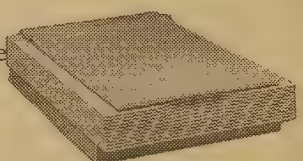

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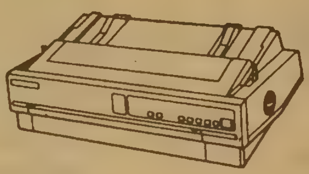

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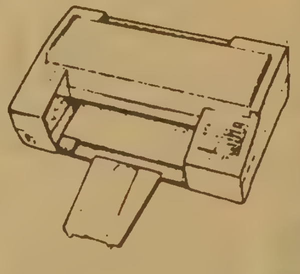

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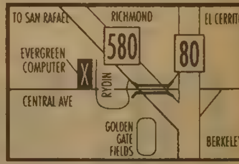

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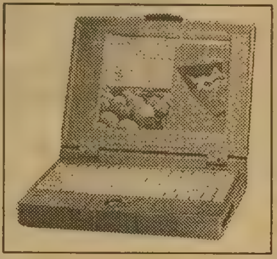

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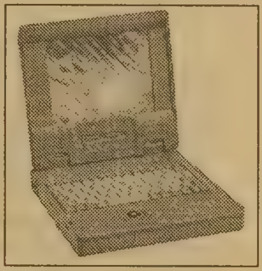

Features:
- Intel 486DX2-66 or 486DX4-100 CPU
- 128K AMI BIOS w/ Password Security
- 4MB RAM On Board, Expandable to 8/12/20/ 36MB
- 258MB, 2.5" Removable Hard Disk Drive
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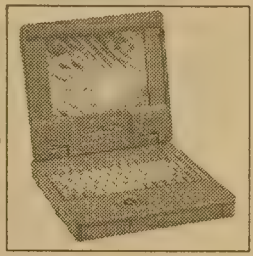

Features:
- Intel Pentium CPU
- 128K AMI BIOS w/ Password Security
- 8MB RAM On Board, Expandable to 16/24/40MB
- 258MB, 2.5" Removable Hard Disk Drive
- 3.5", 1.44MB Floppy Disk Drive Built-in
- Built-in Speakers and Microphone
- Sound Blaster Compatible
- One PCMCIA Type III or Two PCMCIA Type II Slots
- One Serial Port
- One Parallel Port
- SVGA Port (1024x768)
- External Keyboard Connector
- Docking Station Connector
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- 2 Hour Fast Charge
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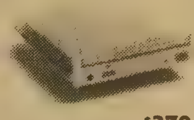

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16 Bit Combo	119
32 Bit EISA Combo	219
Stackable Hubs	
12 port Hub	$599
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Twisted Pair Hubs	
10 BaseT w/12 RJ45	$599
10 BaseT w/8 RJ45	349

3Com

3C503 Etherlink II, 16bit 10BaseT/Coax	$169/174
3C509 Etherlink III, 10BaseT or Coax	119/ 539
3C509 Etherlink III, 16bit Combo	119
32bit EISA Etherlink III, 10BaseT or Coax	229
3C589 PCMCIA, 10BaseT or Combo	189/239

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User Group Network

BULLETIN BOARDS

MULTIZONE

Adventure Connection. (408)985-1529, 734-9475; (415)321-3661, 365-7002, 573-1063, 244-9218, 928-4781; (510)797-4101, 232-1127. 8-N-1, 24 hrs. Real-time, multiuser, interactive fantasy role-playing game; chat. Free trial. [Exp. #134.]

Catené. (408)255-1416, (415)593-6259, (510)656-8055. 24 hrs., 1200–14,400. Astrology, jobs, dating, mystical, self-help, singles, files. Free trial, fee. [Exp. #134.]

Dating Tree BBS. (408)946-1431, main number. 8-N-1, 24 hrs., 300–14,400. 408/415/510. Chat, parties, events, large library; over 18 only. Ladies free/free trial. Sysop: Robert Field. [Exp. #134.]

DSP.COM. (415)647-3213; (510)865-9778, 644-0697, 937-9246, 222-1272. 8-N-1, Personal and professional Internet services, ASP files distribution. Free trial. [Exp. #134.]

Nasty Playmates. (408)374-2627, 254-7007; (415)399-1644, 286-1632, 903-0898, 367-6283; (510)782-2482, 441-9777, 657-9092. 50 lines of naughty fun. Adult chat, matchmaker, more. Over 18 only. Free trial, ladies free. [Exp. #133.]

Pathway BBS. (408)956-5600, (510)790-3127. 8-N-1. 1200–14,400. Sizzling public and private chat. Adults only. [Exp. #135.]

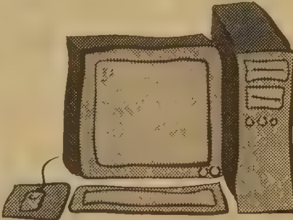
The VidGame BBS. (415)742-6486 (14.4), 742-6618 (28.8), 452-9661; (408)737-7791. Up to 28,800. Windows utilities, games, movie/pics, free Internet email, newsgroups, adult GIFs. Sysop: George Hassmer. [Exp. #134.]

Virtual Pleasures BBS. (408)977-0447; (415)858-2889, 286-0702, 550-9098, 615-0900, 331-3055, 802-0500, 949-1117; (510)254-1525, 939-9616, 215-9875, 791-2551, 888-9204. 24 hrs., 14,400. 44 lines. Intelligent adult chat, 500 forums, 5GB library, vanilla and kinky. [Exp. #134.]

209

ACE InfoSystems. (209)833-0291. 14,400. Doom, other games, news via satellite, shopping mall, fax service, CDs. Fee-based. [Exp. #133.]

Exxxtacy BBS. (209)962-4045. Seven CD-ROMs, DOS/Windows/OS2/ adult files, free adult video with new membership. [Exp. #133.]



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- 7 *fast* CD-ROM drives online, both Adult and Public Domain software
- Public & private message bases for *hot* correspondence
- running TBBS software
- Public and Private message areas
- Online Browsing of user profiles
- Huge collection of non-CD files (countless adult GIF pictures)
- See classified ads from this magazine *before* they're published!
- Several reasonable membership rates
- Now available in Southern CA!

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Voice Info: 408.956.5650
(membership rates can be found online.)

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Fremont, Newark area - 510.790.3127
southern california (new!)
714.236.4247

408

#1 Fun Seekers. (408)379-0958. 8-N-1, 24 hrs., 14,400+. Four lines. IBM files for all ages, members "free" classified ads. [Exp. #134.]

A32 BBS. (408)378-8252. 9600. Mac, Newton, First-Class, OneNet member network, files, conferences. [Exp. #135.]

Amateur Action BBS. (408)263-3393, 14,400; (408)263-1868, 21,600. 8-N-1. 40 lines. 22,000+ adult amateur GIF files. [Exp. #133.]

Anatomically Correct BBS. (408)733-7429. 24 hrs., 14,400. Adults only. Discussions of adult issues, 100+ X-rated stories, no GIF files, more. Free. Sysop: Howeird. [Exp. #134.]

Auto-PC. (408)229-0403. Find/sell motor vehicles online. Autos, trucks, cycles, boats, and more. Private parties and dealers welcome. Free. [Exp. #135.]

Autos Online. (408)356-1306. 1200–14,400. Shop new car dealers. New and used car locator service. Free. [Exp. #133.]

The Beggar's Tomb. (408)395-1425. Down due to fire. Will be back very soon. [Exp. #135.]

The Best Way. (408)972-1937. 8-N-1, 24 hrs., 2400–14,400. Nursing topics, no GIFs, discussions on topics, messages. Free. [Exp. #134.]

Brain Country. (408)247-3772. 2400–14,400. Doors, files, usurper. Sysop: Michael Luvara. [Exp. #134.]

Byte Cafe. (408)738-2709. 8-N-1, 24 hrs. Eight lines. Chat, games, and IBM files. Free. Sysop: Carl Bacani. [Exp. #134.]

ChristNet BBS. (408)998-3237. 2400–14,400. Voice help (408)438-6658. Churches, files, schools, ministries, software, and more. [Exp. #135.]

Dads & Kids. (408)998-3237. 2400–14,400. Voice help (408)438-6658. IBM and Mac. Custody, legal, financial, counseling, grandparents, second families, men's groups, and more. [Exp. #135.]

Dalik's Dungeon. (408)263-4584. 300–28,800. CD-ROM. Free. [Exp. #134.]

Danny's Creation. (408)247-9302. 9600–28,800. Files and games. Sysop: Danny Youngs. [Exp. #134.]

Entrepreneur's Cafe. (408)956-0932. 8-N-1, 24 hrs., 14,400. Windows required. Small and home businesses, discussions, SBA, finance, Internet, more. Free trial. [Exp. #133.]

Escape To Other Worlds BBS. (408)956-1750. 14,400. Four lines. SF/fantasy/ comics, RIME, Fido, chat, shareware, adult files, 2GB. [Exp. #133.]

EternaL DoOM. (408)942-1659. 8-N-1, 24 hrs.,

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Bay Area BBSes

By Kathleen Creighton

The Mother Of All Downloads

Fileheads with Internet access will be happy to hear that the mother of all downloading BBSes, Exec-PC BBS, is now available by telnet (*telnet execpc.com*). A subscription is $25 for three months or $75 for a year.

Over the years, Exec-PC, which started out as a one-line BBS in the Milwaukee, WI, area in 1983, has grown into a healthy business, supporting over 250 incoming lines. (For you "make quick money with your BBS" fans, note the use of the word "grown.") Although the BBS has over one hundred local message areas and over one hundred Fido message areas, online games, publications, and other areas, Exec-PC's notoriety is based on the number of shareware files it carries—650,000—claimed to be the largest anywhere.

A subscription will also include access to the scan file search facility through Exec-PC's World Wide Web page: *http://www.execpc.com* .

Exec-PC BBS anticipates having ftp (file transfer protocol) ready by the time this column sees print (downloading across telnet is not always reliable). Ftp will include the ability to put the transferred file anywhere the user wants to keep it (assuming that path is writable).

Readers with friends and relatives in the Milwaukee area might want to pursue Exec-PC's Internet provider services, which are very competitive with even those found in the Bay Area.

Exec-PC BBS, 2105 S. 170th Street, New Berlin, WI 53151
1-800-EXECPC-1 (voice/national), (414)789-4200 (voice/local)

BBSes On the Internet

If you're a BBSer who's interested in other places to go with your Internet account, you'll want to follow the "Guide to Select BBS's on the Internet" (SBI), the list of BBSes available by telnet. This list, maintained by Richard Mark, accepts only information which comes direct to it from the BBS sysop.

To receive complete information about the list or getting on the list:

ftp:
dkunix.dkeep.com (in */pub/sbi)*
login: anonymous

gcomm.com (in */internet)*
login: anonymous

ftp.rahul.net (in *pub/wco)*
login: ftp

finger:
sbi@dkeep.com
(Guide to Select BBS's on Internet)

sbiq@dkeep.com
("Quick" Guide to Select BBS's on Internet)

sbi-info@dkeep.com
(Revision Information for current list)

sbi-sysop@dkeep.com
(How to Become a Part of the SBI list)

www:
http://dkeep.com/sbi.html
(includes a "telnet" web page of all SBI BBSes for easy access)

Usenet:
Posted monthly on: *alt.bbs, alt.bbs.internet, alt.bbs.lists, alt.bbs.allsysop*
Or call your local BBS and download SBI0195.ZIP.

Continued ...

BULLETIN BOARDS cont.

2400–14,400. Lots of files, games, message bases. New users extremely welcome! Free. [Exp. #134.]

EXODUS/BDPA Silicon Valley Chapter. (408)654-8911. 8-N-1, 28,800. EXODUS newsmagazine + Black Data Processing Associates; multicultural publication + IT professionals; BDPANet/Afronet/Internet email. Sysop: Willie Mackey. [Exp. #133.]

Family Preservation Society BBS. (408)996-8473. 8-N-1, 24 hrs., 14,400. Legal and informational issues concerning the family., large legal file base. Free. [Exp. #133.]

Free Linux BBS. (408)980-9840. The latest in Linux. Binaries and sources. [Exp. #135.]

Friends Of Republicans BBS. (408)247-3229. 8-N-1, 14,400. Republican's BBS for the good of all. Msg. area, private mail, libraries. Donation supported. [Exp. #134.]

Garlique Graphics Image Center. (408)847-0665, 847-5076. Adult GIFs, Internet newsgroups, shareware, adult CD, instant access. Excellence online. [Exp. #134.]

The Gnome's Guesthouse BBS. (408)448-5705, -5657, -5713, -5655, -6235. 8-N-1, 24 hrs., 4 @ 14,400, 1 @ 9600. Five lines. Chat, CircleMUD, adult areas, FRPs, files, all ages. Free. [Exp. #134.]

The Hidden Lair BBS. (408)979-0812. 1200–28,800. Multichat, adult files, games, message bases, 2GB of storage. Free. Sysop: Drakkhen. [Exp. #134.]

LINCS-BBS. (408)727-7227. 8-N-1, up to 14,400. Resources for special needs of all ages. Disability files, national resource directory, Internet mail. Usenet. $25/yr for Internet. Sysop: Trudy Grable. [Exp. #135.]

Matrix Online Service. (408)378-6588. 14,400. New phone number!!! BBS gateway service, games, 'zines, gov't. job listings. Sysop: Darryl Perry. [Exp. #134.]

The Meating Place BBS. (408)926-6174. 24 hrs., 14,400. Nine lines. Gay/Bi, adult, email, chat, matchmaker, GIFs, XXX stories. System password: MICRO. [Exp. #134.]

Mongoose BBS. (408)733-3034. 24 hrs., 14,400/16,800. Two lines. SmartNet, +GB of the latest shareware on CD-ROM. Free. Sysop: Robert Yagmourian. [Exp. #133.]

Monterey Gaming System. (408)655-5555. 14,400. 32 lines. Free Internet email, chat, contests, games, Doom/Doom II. Free trial. [Exp. #133.]

Mountain Retreat. (408)335-4595. 24 hrs., 14,400. FidoNet, 2.9GB HD, 20,000+ files, Turbo Pascal is the specialty. Sysop: John Jamieson. [Exp. #133.]

Nebula BBS. (408)738-4679. 24 hrs., 1200–14,400. Sports games, adventure games, summer PTP league. Sysop: Richard W. Novy. [Exp. #135.]

NOHO BBS. (408)259-3864. 2400–14,400. Wildnet, AR-Net, Uni-Net echomail, Internet newsgroups, 30,000+ files, and more. Sysop: Brian Parker. [Exp. #135.]

Paradise City BBS. (408)280-6630. 2400–14,400. 25,000+ newest IBM, Windows, adult files. RIP EGA graphics, mouse support. Free. Sysop: Jim Reed. [Exp. #133.]

P.D.S.E. (408)241-0722. 8-N-1, 24 hrs., 2400–9600. Eight lines. Clean files, discussions, games, helpful people. [Exp. #134.]

Positive Image Studio. (408)270-8916. 8-N-1, 24 hrs., 300–28,800. Six lines. FirstClass, One-Net member, files, Mac, adult, PC/Win. [Exp. #134.]

The Rising Storm. (408)926-9445. 8-N-1, 24 hrs., 28,800. Politics, survival, ham radio. TNC access for hams. Ham callbook online. [Exp. #135.]

The Shuttle BBS. (408)289-1911. 24 hrs., 2400–28,800. 3.5GB of files, two CD-ROMs, Doom, multimedia, online games, and more. Sysop: Michael Vedda. [Exp. #135.]

The Silicon Matchmaker. (408)492-9700. 24 hrs., 300–14,400. 20 lines. Personal introductions—you meet the nicest people online. [Exp. #135.]

San Jose Advisor. (408)274-6004. 8-N-1, 10 am–11 pm, 300– 57,600. Politically oriented. City, county, state, and fed. Election and legislative info. Free. [Exp. #135.]

The Support Network BBS. (408)259-0297. 8-N-1, 24hrs., 2400–14,400. ADA Network, ABLEDATA database, Trace Research Center Library, educational files, RIP graphics. Free. Sysop: Frank Arnold. [Exp. #134.]

Sweet Whispers BBS. (408)229-9001. 8-N-1, 24 hrs., 14,400. 10 lines. Adult social network, chat, MatchMaker, email, forums, library, RIP. Free trial. [Exp. #134.]

Thunder Mountain BBS. (408)842-0764. 8-N-1, 24 hrs., 2400–14,400. Six lines. Chat, games, CD-ROM, matchmaker, user friendly. Free after validation. [Exp. #134.]

TIPS BBS. (408)265-7529. 8-N-1, 24 hrs., 1200–14,400. Internet email, Usenet newsgroups, latest shareware, technical support. Free/fee. [Exp. #134.]

VidGam2 BBS. (408)737-7791. Nine nodes. Multizone; steamy adult GIFs; games; utils.; Internet newsgroups, email, FTP-mail. Sysop: Marcelo Hassmer. [Exp. #135.]

The Warped Disk. (408)288-6891. Files, chat, forums, photos, adult, RIP, more. Free audio CD w/subscription. [Exp. #133.]

The X-Files BBS. (408)476-6237. 1200–14,400. Door games and many adult files, VirtualNet. No ratios. Free. Sysops: Guido Crepax and Space Cowboy. [Exp. #135.]

415

A.S.D.I.P. (415)468-3886. up to 28,800. Six lines. 42,000 files, over 14GB, adult issues. Free trial. [Exp. #134.]

The Baud BBS (415)343-5799. 24 hrs, 9600+. You won't believe your eyes! Multitasking Windows BBS! Internet, 5+GB of files. [Exp. #133.]

Bay Area Luv Connection. (415)822-7550. 24 hrs., 16 lines. Adult board. Fee, women free. Voice: (415)239-1028. Sysop: Ronni (voice: 415/239-0802). [Exp. #133.]

Bay Area State Parks. (415)726-0358. 24 hrs., 9600. Bay Area State Parks information BBS. Free. [Exp. #134.]

BayHomeNet. (415)570-7133. 24 hrs., 9600. Public access real estate, Q&A, mortgage rates, first-timer programs, more! [Exp. #133.]

Charisma II. (415)802-9011. 8-N-1, 23 hrs., 1200– 14,400. 26,000+ files, two CD-ROMs, 650+ forums, regional hub for SeekNet, more. Free access. Sysop: Robert Maverik. [Exp. #135.]

The Cosmic Cube. (415)583-2780. 24 hrs., 14,400. Multi-networked. Sci-fi/science/general strategy space gamers. So. San Francisco. Free. [Exp. #134.]

CRC BBS. (415)428-3702. 24 hrs., Educational games and related programs for teachers and students. Free. [Exp. #133.]

DivaNet. (415)695-7452. 24 hrs., 14,400. Alternative fashion and entertainment network; online fetish fashion store; JPEG downloads. 18+. $10/month. [Exp. #135.]

Dragon Ball BBS. (415)731-9265. Tons of files, mostly adult; play games while downloading. [Exp. #133.]

The Erogenous Zone! (415)586-6616. 8-N-1, up to 28,800. Adult GIFs, shareware, PD, 500MB storage, six CD-ROMs. Needs new users. [Exp. #134.]

The Family BBS. (415)459-6094. 24 hrs., 14,400. Usenet, Internet mail, parenting, childcare, health, investments, software, hardware. Free/Fee. [Exp. #135.]

Fog City. (415)863-9697. 8-N-1. Multiline, gay and lesbian community/chat, matchmaking, CD-ROMs, games. 2.4GB. [Exp. #134.]

Foggy Grotto. (415)756-3219. 8-N-1, 24 hrs., 14,400. Debate encouraged, open-mindedness expected. Discussion only—no files. Sysop: Aceebro. [Exp. #134.]

Gamers BBS. (415)592-4496. 8-N-1, 24 hrs., 2400–14,400. Hints, tips, walk-throughs for many video and PC games, more. Free access. Sysop: Anthony. [Exp. #134.]

Games & Stuff BBS. (415)369-1110. 8-N-1, 24 hrs., 14,400. Internet email, adult areas with reg., shareware games and utilities. Sysop: Paul. [Exp. #133.]

Golden Gate Computer Society BBS. (415)457-2516. 24 hrs., 14,400. 2GB of files, 30 min/day free. ILink, Cal.Link: free. Usenet and Internet email: $24/year. [Exp. #135.]

Hempland BBS. (415)369-HEMP. 24 hrs., 14,400. World's first all hemp BBS. Nonprofit educational community service. Always free. [Exp. #133.]

IBBS West. (415)564-9996. 8-N-1, 24 hrs., 300–14,400. Five lines. PC and compatibles, shareware, utils., adult GIFs, CD-ROM, 13,000 files. Fee. [Exp. #135.]

In Sync. (415)507-9463. 8-N-1, 24 hrs., 14,400. 50+ door games, tons of Doom files, and much more! Sysop: Tektronix. [Exp. #133.]

Interact. (415)961-6911. The Interactive Entertainment System. No time limits, live action chat, 18+ only. Instant

Bay Area BBSes cont.

The Online Islamic Bookstore

Followers of Islam (Muslims) and those interested in the faith might want to take a look at this Sunnyvale BBS, which features a searchable database of Islamic books (by author and title) for sale, as well as teaching materials, book, software, and CD-ROM reviews, and some explanatory Islamic texts online.

This is not an electronic book downloading service. Orders for items found on the BBS are made by phone.

(415/969-7335, 1200–14,400 bps, sysop Sharaaz Khan.)

The Floor Show BBS

This month's San Francisco BBS hangout is The Floor Show, a conversational BBS with active local message boards, a definite "local pub" feel, and a "G" rating. If San Francisco were in my local calling area, I'd want to visit here. Novices to BBSing are welcome and encouraged.

(415/952-3231, 2400–14,400 bps, sysop Donna Hall). ■

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BULLETIN BOARDS cont.

free access. [Exp. #135.]

Intimate Images. (415)598-0898. 1200– 16,800. Original adult images and video clips. The Bay Area's finest adult BBS. [Exp. #134.]

Key Software Products BBS. (415)364-9847. 5 pm–8 am M–F, 24 hrs. wknds. 1200–28,800. Tech support for Last Byte Memory Manager. Internet email, fax-mail, shareware. Free. Sysop: Dan Lewis. [Exp. #135.]

Lincoln's Cabin BBS. (415)752-4490. 2400–28,800. Internet email, Usenet, RIME, Boardwatch and Connect magazines, files! Free trial. [Exp. #134.]

Love Bytes. (415)333-0837. 24 hrs., 14,400. Gay/Bi friendly, multiline chat, Internet email, Usenet, over 18 only, more. Free trial. Sysop: Douglas Raggett. [Exp. #133.]

The Mac Daddy BBS. (415)587-9052. 24 hrs., 14,400. Best local message area, too many nets to list, 3GB Mac files. Sysops: Jonathan Mergy, Robert Pomon. [Exp. #135.]

Main Street BBS. (415)355-9015. 24 hrs., up to 14,400. Mac/PC, great shareware/freeware, Main Street Buyer's Club, conferences, chat, etc. Free trial. Sysop: Bill Baker. [Exp. #135.]

The Mother Ship. (415)665-5496. 8-N-1, 24 hrs., 2400–28,800. A new board dedicated to life and higher consciousness. Free! Sysop: Roland Campos. [Exp. #134.]

The Natural World. (415)261-1212. 9600. San Francisco Mycological Society, mushrooming, nature, politics. Free. [Exp. #133.]

The Nerdshack. (415)681-1724. 8-N-1, 24 hrs., 300–14,400. Free Internet, files, games. We are computer nerds, come join us! Free. Sysop: Porter Venn. [Exp. #134.]

Net-Link Online BBS. (415)456-4567. 1200–28,800. 10 nodes. Full Internet access, free Internet email to all callers, Usenet, more. [Exp. #134.]

The PC GFX Exchange. (415)337-5599. 8-N-1, 24 hrs., 28,800. 3GB files (graphics, utilities, animation), 3000 conferences (FidoNet, Usenet, ILink)! [Exp. #134.]

The Pyramid/2 OS/2 BBS. (415)494-7497. 8-N-1, 24 hrs., 1200–14,400. Provides the latest in OS/2 files, information. Files added daily. Free. Sysop: Sven Sampson. [Exp. #134.]

realitycheckBBS. (415)648-9489. 14,400. Instant access, coffee, text, cigars, and tech. NIRVANAnet. [Exp. #134.]

The Shareware Exchange! (415)992-4320. 8-N-1, 24 hrs., 9600–14,400. Games, IBM utilities, cracks, messages. Free! Sysop: Christopher Jong. [Exp. #135.]

Solar Hydrogen BBS. (415)494-3116. 8-N-1, 1200–14,400. Alternative energy info—prosperity without pollution. Sysop: Howard H. Smith. [Exp. #133.]

Symmetrics BBS. (415)382-6679. 8-N-1, 24 hrs., 1200–14,400. Internet information. [Exp. #134.]

Toad Hall BBS. (415)595-2427. Mature user system, no X-rated graphics, 36,000 files, conferences, Internet email, Usenet newsgroups. Free trial. Sysop: Gordon Anderson. [Exp. #133.]

Uncle D's Directory. (415)364-3001. High-speed US Robotics. Five+ nodes. Internet, RIME, private conferences, files, store, chat, games. Free. [Exp. #135.]

Urbanite BBS. (415)903-9355. 8-N-1, 24 hrs., 57,600. RIP support, multiline, Windows, DOS, multimedia, huge download area. Free. [Exp. #135.]

Wetware Diversions Public UNIX. (415)826-0397. 8-N-1, 24 hrs., 1200/2400. Eight lines. Full Usenet news. Sysop: Eric Swanson (editor@wet.UUCP). [Exp. #134.]

Window World BBS. (415)931-0649. 24 hrs. For people who use Windows-type software; info, shareware, chat. Sysop: Bob Cram. [Exp. #134.]

510

8-Bit Apple User Group. (510)294-8052. 24 hrs., 300–2400. Apple II, UL/DL, email, games. No fees. Sysop: Noel Anklam. [Exp. #133.]

Aaron Construction Company BBS. (510)521-0281. 8-N-1, 24 hrs., 2400–14,400. Construction Q&A, files, Paul Revere and FamilyNet echo conferences. Free. [Exp. #134.]

Albatross! Gardening Club BBS. (510)449-8750. 8-N-1, 14,400. New, mostly IBM with some Mac areas, looking for users and suggestions. Free. Sysop: Paul George. [Exp. #134.]

Amiga Addicts Anonymous BBS. (510)680-2850. 24 hrs., 1200–14,400. Amiga files only. Free. Sysop: Stanley R. Poland. [Exp. #134.]

Bay Area Mega Board. (510)247-8300. 24 hrs. 16 lines. UltraChat, USysOp, VSysOp, TSC, FidoNet, Internet, adult/gen. Free and fee. Sysop: Sam Thompson. [Exp. #135.]

Callisto Tower BBS. (510)794-9788. 24 hrs., 14,400. Member of VAMPNET, a net you can really sink your teeth into! Free. Sysop: Gus Damian. [Exp. #134.]

Camelot BBS. (510)494-1060. 1200–57,600. The multitasking BBS! Free terminal software, files, Internet, sports, games... [Exp. #134.]

Club 100 BBS. (510)939-1246. 8-N-1, 24 hrs., 300/1200/2400. Model 100 user group supporting Tandy, Model T computers. Free/fee. [Exp. #133.]

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Diablo BBS. (510)838-7687. 8-N-1, 24 hrs., 2400–14,400. Multiline, files, FidoNet msgs., general purpose and PC Clubhouse Network. [Exp. #133.]

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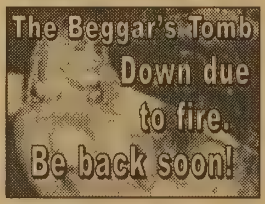
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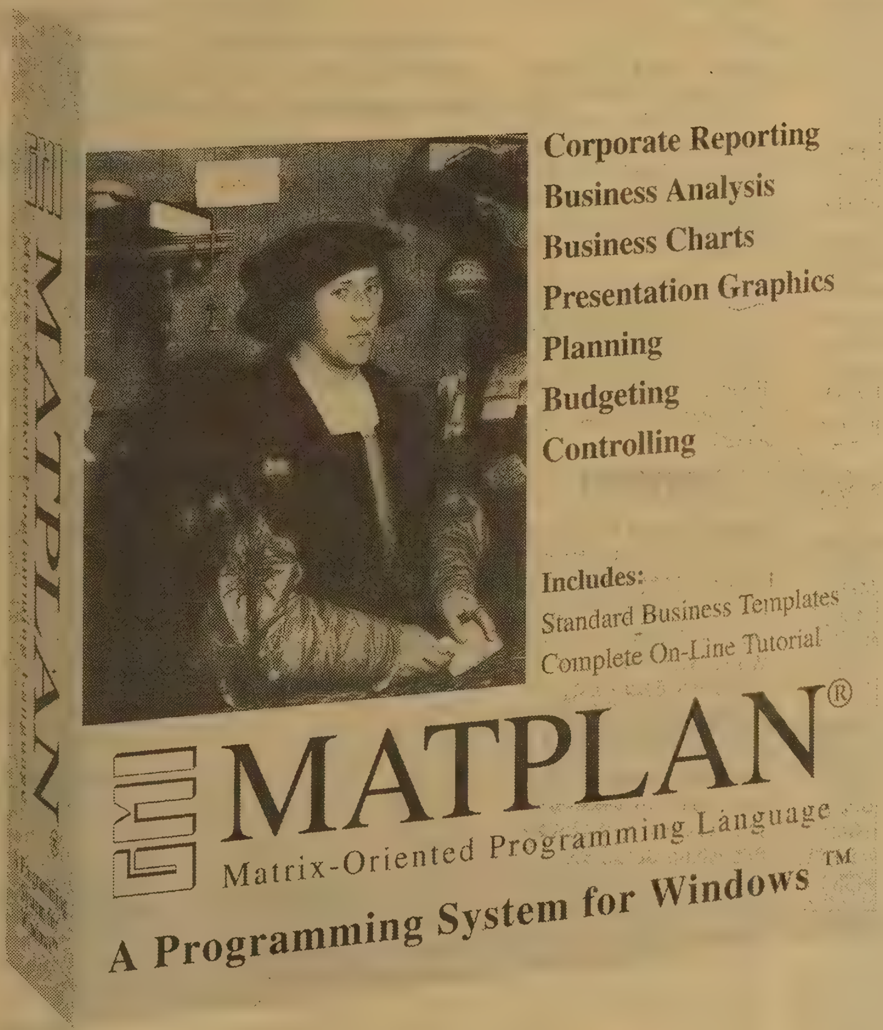
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USER GROUPS

AMIGA

AUM—Amiga Users Of Marin. Meetings: 3rd Wed., 7:00 pm, College of Marin Science Center, Rm. 192, Kentfield. Desktop video, Amiga applications. Call: (415)479-6717. BBS: (415)459-6621. [Exp. #133.]

AWEST—Amiga Users In SF. Meetings: 2nd Wed., 6:30 pm, Excelsior Branch Public Library, 4400 Mission St. (near Ocean), San Francisco. Call: (415)584-8406. BBS: (415)441-5145. [Exp. #133.]

RE-Amiga—Redwood Empire Amiga User Group. Meetings: 2nd Tues., 7:30 pm. Call: (707)523-9978. BBS: (707)539-6944. [Exp. #133.]

TOGA—The Other Group Of Amigoids. Meetings: 4th Sat. (Sun. in April), 12:30 pm, Milpitas Community Library Meeting Room, 40 N. Milpitas Blvd., Milpitas. An informal group to share ideas, PD software, and information. Call: Lawrence Brown, (408)744-0162; Randy Abel, (408)356-9405. [Exp. #138.]

APPLE

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. Beginners and advanced, Q&A, new product demos, public domain software. Call: Kent Fillmore, (415)571-1433. [Exp. #133.]

SPC Apple User Group. Meetings: 2nd Tues., 7:00 pm, CompUSA, Newpark Mall, Newark (I-880 exit west on Steveson or Morey). The Society for Prevention of Cruelty to Apple Computers Users Group supports all Apple and Macintosh computers. Call: Dean Fearn, (510)881-9160. [Exp. #133.]

ATARI

San Leandro Computer Club. Meetings: 1st Tues., 8:00 pm, San Leandro Main Library, Estudillo Room, 300 Estudillo Ave. Call: Robbie, (510)797-5636. [Exp. #138.]

CAD

BMUG CAD SIG. Meetings: last Wed., 6:00 pm, Academy of Art College, 79 New Montgomery, San Francisco. Environmental design/drafting. Call: (510)549-BMUG. [Exp. #137.]

MAUG—Marin AutoCAD Users Group. Meetings: 1st Thurs., 6:30 pm, Autodesk, 3950 Civic Ctr. Dr., Demo Room, San Rafael. Call: Priscilla Mills, (415)453-4480. [Exp. #133.]

Sonoma County AutoCAD Users Group. Meetings: 3rd Wed., 6:30 pm, Piner High School, Rm. H-83, 1700 Fulton Rd., Santa Rosa. Call: John Weitzel, (707)525-8147. [Exp. #137.]

COMMODORE

C=HUG (Commodore Hayward User Group). Meetings: 2nd Sat., 2:00 pm, Palma Ceia Park. (510)531-3734. [Exp. #137.]

Diablo Valley Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm, Contra Costa Water District Anteroom, 1331 Concord Ave., Concord. Call: (510)689-3224. [Exp. #137.]

DESKTOP PUBLISHING

BMUG Desktop Publishing And Design SIG. Call: Les Cowan, (415)641-6033. [Exp. #138.]

CorelDRAW Ventura Users Group. Meetings: 1st Mon., Varian Associates, 3075 Hansen, Palo Alto. $2/person. Call: Rick Altman, (408)252-5448. [Exp. #138.]

IBM AND COMPATIBLES

BAYTALK. Meetings: 3rd Tues., 6:00 pm, Sun Peking Restaurant, 2068 Center St., Berkeley. For low-vision and other disabled persons; learn about adaptive technology and develop computer skills. Call: (415)777-4777. [Exp. #133.]

Diablo Valley User Group—DVPC. Meetings: 1st Thurs., 7:30 pm, Bank of America, Bldg. B, Clayton Rd. at Galindo, Walnut Creek. SIGs include Windows, Paradox, Beginner's, Visual Basic, education/entertainment, and more. Call: (510)943-1367. [Exp. #134.]

EastBay FOG. Meetings: 2nd Wed., 7:30 pm, Episcopal Church of St. John-in-Montclair, 1707 Gouldin Rd., Montclair. All microcomputers, MS-DOS, CP/M. Call: (510)653-2627. [Exp. #138.]

F.U.N. PC Users Group. Meetings: 1st Wed., 6:00 pm, CompUSA, Training Room, Newpark Mall, Newark (I-880 exit west on Steveson or Morey). Visitors welcome, no experience necessary. Call: (510)795-4286 #8. [Exp. #133.]

Golden Gate Computer Society. Meetings: 4th Mon., 7:00 pm, San Rafael Community Center, 618 B St., San Rafael. Free intro to computers class at 6:00 pm. Call: (415)454-5556. [Exp. #138.]

Napa Valley PC Users Group. Meetings: 2nd Wed., 7:30 pm, Napa High School Lecture Hall, 2475 Jefferson St., Napa. Call: Lee Schwab, (707)257-2675. [Exp. #138.]

NaSPA Bay Area Chapter. Meetings: last Tues. of odd-numbered months, 3131 Zanker (near First and Montague), San Jose. Technical aspects of corporate computing with emphasis on IBM and compatible mainframes. Call: Radi Shourbaji, (408)526-3258. [Exp. #133.]

PC Clubhouse. Meetings: 1st Fri., 7:30 pm, Meiklejohn Hall, Room 2002, CSU Hayward. Share knowledge and PD/shareware, network of BBSes, mentor assistance, SIGs. Swap starts at 7:00. Call: (510)538-2449 or 276-6450. [Exp. #138.]

PC Users Group Of The Redwoods. Meetings: 2nd Thurs., 6:30 pm, Santa Rosa Veteran's Memorial Building, East Dining Room, Maple Ave., Santa Rosa. Call: (707)527-USER; or Mel Del Gallo, (707)571-0373. [Exp. #133.]

Peninsula Computer Club. Meetings: 2nd Thurs., 7:30 pm, Rec Room, 222 Laurel St., San Carlos. DOS and CP/M libraries. Call: (415)593-9981. BBS (415)571-9259. [Exp. #138.]

San Francisco Business Computers. Meetings: 4th Tues., 5:30 pm. 110 Pacific #153, San Francisco. For those who use computers in business. Visitors $10. Call: Jordan Rosenberg, (415)788-5338. MCI Mail: 425-1545. [Exp. #138.]

San Francisco Computer Society. Meetings: 4th Mon., 7:00 pm, Presbyterian Church, 1329 7th Ave., San Francisco. CPM and DOS, novices welcome. Call: Bob Forsberg, (415)885-6202. [Exp. #138.]

San Francisco PC Users Group. Meetings: 3rd Tues., 6:15 pm SIGs, 7:30 pm General Meeting. St. Mary's Conference Center, 1111 Gough St., San Francisco. Call: (415)346-2644, events; Kendall Callas, (415)821-1310; Loyd Cribs, (415)751-5219. [Exp. #138.]

SEF Business Operations SIG. Meetings: 1st Tues., 7:00 pm, Center for Software Development, 111 W. St. John St., Ste. 200, San Jose. A special interest group of the Software Entrepreneurs' Forum. Call: Mike Schmit, (408)244-6826. [Exp. #133.]

SEF International Software SIG. Meetings: 3rd Mon., 7:00 pm, Center for Software Development, 111 W. St. John St., Ste. 200, San Jose. A special interest group of the Software Entrepreneurs' Forum. Call: Charlie Pfefferkorn, (408)923-7570. [Exp. #133.]

South Bay WordPerfect User Group. Meetings: 4th Tues. (no Dec. meeting), Saratoga Community Library, Fruitvale and Saratoga Ave., Saratoga. Free. Call: Scott Maiden, (408)253-4591. [Exp. #133.]

Stanford/Palo Alto PC User's Group. Meetings: last Wed., 7:30 pm, Varian, 3075 Hansen Way (off Page Mil Road), Bldg. 7, Palo Alto. Call: (415)952-5632. [Exp. #138.]

INTERNET

BMUG Internet SIG. Meetings: 2nd and 4th Weds., 7:00 pm, BMUG office, 2055 Center St., Berkeley. Accessing the Internet through World Wide Web using the Macintosh. Email: *dan_meriwether* or *susan_adrian @bmug.org* . [Exp. #137.]

Online And Interactive SIG. Meetings: 3rd Tues., 6:30 pm, usually at Software Publishing Corp., Bldg. 3, 3165 Kifer Rd., Sunnyvale. SIG of the Silicon Valley chapter of the Society for Technical Communication. Call: Charly Rhoades, (408)379-7000 ext. 1414 or *charly@hal.com* . [Exp. #137.]

SEF Internet SIG. Meetings: 2nd Wed., 7:30 pm, Sun Microsystems, 2750 Coast Ave., Bldg. 6, Mountain View. $10 for nonmembers. Call: (415)390-9477. [Exp. #137.]

LEGAL

BMUG Law SIG/ Law SIG South. Meetings: irregular. Call: Randy, (916)661-2280 or *rbs@aol.com* . [Exp. #137.]

SF Bar Assoc. WordPerfect User Group. Meetings: 3rd Wed., odd-numbered months, noon, SF Bar Assoc. Boardroom, 7th Fl., 685 Market St. Brown bag meetings. Call: (415)421-5650. [Exp. #137.]

MACINTOSH

Association Of A32 Users. Meetings: 2nd Sat., 10:00 am, Sunnyvale Community Center Arboretum, 550 E. Remington Ave. (near corner of El Camino and Fair Oaks). Q&A session; guest speakers and vendor demonstrations; shareware, freeware, and PD software disks. Call: (408)263-0398. [Exp. #138.]

BMUG—Berkeley Macintosh User Group. Meetings: every Thurs., 6:00 pm, Warren Hall, Rm. 22, UC Berkeley campus. Call: (510)549-BMUG. [Exp. #137.]

BMUG LesBiGay SIG. Meetings: 3rd Sun., 6:00 pm, BMUG office, 2055 Center St., Berkeley. Call: see the LesBiGay conference on Planet BMUG (bmug.org). [Exp. #137.]

BMUG West. Meetings: last Mon., 6:30 pm, San Francisco Exploratorium. Call: (510)549-BMUG. [Exp. #137.]

Diablo Valley Macintosh User Group (DVMUG). Meetings: 3rd Tues., 7:00 pm, Bancroft School, 2200 Parish Dr., Walnut Creek. Get together with Mac and Performa users. Enjoyable SIG meetings. Call: Tom Bacon, (510)945-4548. [Exp. #138.]

International Macintosh Users Group (IMUG). Meetings: 3rd Thurs., 7:00 pm, Apple Computer, R&D Campus, 1 Infinite Loop, Cupertino. A forum for multilingual/multiscript computing. Call: Roger Sherman, (415)859-5146. [Exp. #138.]

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. Beginners and advanced, Q&A, new product demos, public domain software. Call: Kent Fillmore, (415)571-1433. [Exp. #133.]

SEF Macintosh SIG. Meetings: 3rd Tues., 7:00 pm, Apple Auditorium, 4 Infinite Loop, Cupertino. Sponsored by Software Entrepreneurs' Forum. $10 for non-SEF members. Call: Jeff Cherniss, (408)358-5150. [Exp. #138.]

SMUG (Stanford Palo Alto Macintosh User's Group). Meetings: 1st Mon., 7:00 pm, Syntex Conference Center, 3401 Hillview Ave., Palo Alto. Call: (415)328-4933. [Exp. #137.]

MARKETING

SEF Marketing SIG. Meetings: 4th Thurs., 7:00 pm, Cubberley Community Center, Rm. H-1, 4000 Middlefield Rd., Palo Alto. A special interest group of the Software Entrepreneurs' Forum. Call: Bill Ryan, (415)615-7906. [Exp. #133.]

MISCELLANEOUS

California Genealogical Society SIG. Meetings: 2nd Sat. odd months, CGS Library, 300 Brannan St., 4th Fl., San Francisco. All makes, models, and software welcome. Call: Dave Wilma, (415)777-9936 or *DaveW50789@aol.com* . [Exp. #134.]

MULTIMEDIA

Joe's Digital Diner. Meetings: every other week, 5:30 interactive happy hour, 7:00 pm dinner, 8:00 pm showcase, 3435 Army St., Ste. 222 (at Valencia), San Francisco. An evening mixing home cooking, six multimedia stations, and a special presentation on new media, Internet, etc. Call: (415)824-9394. [Exp. #137.]

Macromedia User Group. Meetings: 1st Tues. (except Jan.), 6:00 pm, 600 Townsend St. at 7th, San Francisco. For multimedia developers of all levels who use Macromedia products. $5. Call: (415)252-2295. [Exp. #137.]

SEF Multimedia SIG. Meetings: 1st Thurs., 7:00 pm, Center for Software Development, 111 W. St. John St., Suite 200, downtown San Jose. SIG of Software Entrepreneurs' Forum. Call: Ralph Gilman, (408)746-0551. [Exp. #137.]

MUSIC

Computer Music Group. New group forming to explore computer music beyond MIDI—UNIX, mathematical modeling, networks, multiprocessing, etc. Call: Bob, (415)592-6993. [Exp. #138.]

NETWORKING

Apple Network Manager's Association. Meetings: 3rd Thurs., 5:30 pm, Syntex Laboratories, Palo Alto. A forum for discussing problems and solutions associated with managing mixed environments with AppleTalk networks. Call: Bill Woodcock, (510)843-6369, email *woody@zoca-*

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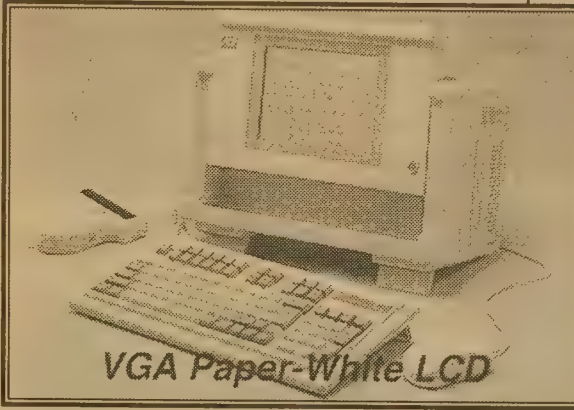

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USER GROUPS cont.

lo.com for directions. [Exp. #137.]

BMUG Networking SIG. Meetings: 4th Tues., 7:00 pm, BMUG office, 2055 Center St., Berkeley. Call: James, (510)233-7151. [Exp. #137.]

Networking Windows SIG. Meetings: 3rd Wed., El Cerrito. For users of Windows for Workgroups, 95, NT, Advanced Server. Call: (510)528-9895. [Exp. #134.]

SEF Client/Server SIG. Meetings: 4th Tues., 7:00 pm, Cubberly Community Ctr., Rm. H-1, 4000 Middlefield Rd., Palo Alto. A special interest group of the Software Entrepreneurs' Forum. Call: Patrick O'Brien, (415)726-4664. [Exp. #133.]

NOVELL

South Bay NetWare Users Group. Meetings: monthly, 6:00 pm, 890 Ross Dr., Sunnyvale. Call: Allan Hurst, (415)525-4567 or *allanh@spectrum.us.com* . [Exp. #134.]

OS/2

OS/2 Bay Area User Group. Meetings: 4th Mon., 7:30 pm, Stanford Linear Accelerator Center Auditorium, 2575 Sand Hill Rd., Menlo Park. For anyone interested in OS/2. Presentations, demonstrations, question and answer session. Call: (510)945-7565 ex. 611. [Exp. #138.]

PARADOX

bapals (Bay Area Paradox User Group). Meetings: 4th Tues., 5:00 pm, McKesson Building, 1 Post St., 18th Fl., San Francisco. Call: (415)995-4688. [Exp. #133.]

PEN

SEF Pen/Mobile Computing SIG. Meetings: 4th Wed., 7:00 pm, Cubberley Community Center, Rm. H-1, 4000 Middlefield Rd., Palo Alto. A special interest group of the Software Entrepreneurs' Forum. Call: Bill McAlpine, (415)348-2257. [Exp. #133.]

Stanford Newton User Group. Meetings: 2nd & 4th Tues., 7:00 pm, Printer's Inc. Bookstore Cafe, 310 California Ave., Palo Alto. Call: Flash Sheridan, (415)462-9203 or *FlaSheridn@rahul.net* . [Exp. #134.]

PROGRAMMING LANGUAGES

BMUG Forth SIG. Meetings: 2nd Sat., 12:00 pm, BMUG office, 2055 Center St., Berkeley. Forth for beginners, 12 noon; introductions, 1:00 pm; talks and demos 1:30–5:00 pm. Call: Leonard, (510)376-5241. [Exp. #137.]

BMUG Programmers' SIG. Meetings: alternate Weds., 7:00 pm, BMUG office, 2055 Center St., Berkeley. Mac Toolbox, C, and Pascal. Call: (510)549-BMUG. [Exp. #137.]

SEF C/C++ SIG. Meetings: 4th Fri., 6:15 pm, UC Santa Cruz Extension, 3120 De La Cruz Blvd. (Trimble at 101), Santa Clara. A new special interest group of the Software Entrepreneurs' Forum. Call: Marian Corcoran, *mcorcora@ix.netcom.com* [Exp. #137.]

SEF Intelligent Systems SIG. Meetings: 2nd Mon., 7:00 pm, Center for Software Development, 111 W. St. John St., Ste. 200, San Jose. A special interest group of the Software Entrepreneurs' Forum. Call: Leor Jacob, (415)595-5200. [Exp. #133.]

SEF Visual BASIC SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Community Center, 4000 Middlefield Rd., Rm. H-1, Palo Alto. Sponsored by Software Entrepreneurs' Forum. Call: Allan Colby, (415)851-4567. [Exp. #133.]

Silicon Valley Forth Interest Group. Meetings: 4th Sat., 10:00 am–5:00 pm, 230 Lincoln Centre Dr., Foster City. Call: Dr. C.H. Ting, (415)638-5669 (w), 571-7639 (h). [Exp. #137.]

PROJECT MANAGEMENT

Microsoft Project Users Group. Meetings: 3rd Tues., alternates between San Jose and Foster City. Q&A, speakers, product demos, and other topics related to Microsoft Project and project management. Call: Jim Spiller, (707)425-2484. [Exp. #137.]

TEXAS INSTRUMENTS

TI-99/4A. Meetings: 2nd Sat., Oakland. Call: Fred, (510)530-8335. [Exp. #138.]

UNIX

SEF UniForum Open Systems SIG. Meetings: 2nd Tues., 7:00 pm, DEC Auditorium, 130 Lytton Ave., Palo Alto. A special interest group of the Software Entrepreneurs' Forum. Call: George Bosworth, (415)851-3304. [Exp. #133.]

VIDEO TOASTER

Bay Area Video Toaster Users Group. Meetings: 4th Tues., 7:00 pm, Richmond Public Library, Whittlesey Room, 325 Civic Center Plaza, Richmond. Product demos, guests, info, tips, and much more. Call: Don Smith, (510)620-6759. [Exp. #133.]

Silicon Valley Video Toaster Users Group. Meetings: last Thurs., 7:00 pm, HT Electronics, 275 N. Mathilda Ave., Sunnyvale. Special guests, equipment demos, hands-on workshops, info/tips on Toaster 4000 and System 3.1. Call: Andrew Timmins, (408)243-9233 (eve.). [Exp. #134.]

WINDOWS

BMUG Windows SIG. Meetings: 1st Tues., 6:30 pm, BMUG office, 2055 Center St., Berkeley. Call: Robin, (510)527-8993. [Exp. #137.]

SEF Windows SIG. Meetings: 1st Wed., 6:30 pm, Cubberley Community Center, Room H-1, 4000 Middlefield Rd., Palo Alto. SIG of the Software Entrepreneurs' Forum. $15 for nonmembers. Call: Fran Finnegan, (415)288-4400. [Exp. #137.]

WIRELESS

SEF Wireless SIG. Meetings: 1st Mon., 7:00 pm, Center for Software Development, 111 W. St. John St., Ste. 200, San Jose. A special interest group of the Software Entrepreneurs' Forum. Call: Patrick Glenn, (408)448-3844. [Exp. #133.]

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Maddog! BBS. (510)483-0203. 2400–28,800. Two lines. 10 CD-ROMs, 60,000+ files, online games, FidoNet, HotNet, sports. Sysop: Troy Earp. [Exp. #135.]

mediacom—USA BBS. (510)521-5757. 8-N-1, 24 hrs., 2400–28,800. Support and registration site for terminal program TERMINATE and Archiver RAR. Free access. [Exp. #134.]

Orion. (510)447-1060. 28,800. Two nodes. Space/science/computers related, 2GB d/l files, msg. base. Sysop: Shaun Coleman. [Exp. #134.]

Otoko Empire BBS. (510)370-6253. 24 hrs., 1200–14,400. Male GIFs: large galleries of Asian, Black, and Latino files. Adult reg. req. Free/pay. [Exp. #134.]

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Silicon Knights BBS. (510)676-7640. 24 hrs., 14,400. FidoNet, Usenet, Internet email; support for Novell professionals. Free access/donations. Sysop: Steve Gleisner, Ed Donegan CNE. [Exp. #133.]

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ASSOCIATIONS

The Assembler Multitude. Meetings: every 3rd week on Mon., 7:30 pm, University Lutheran Church, 1611 Stanford Ave., Palo Alto. An open discussion of new technical developments in many fields and how they relate to nanotechnology. Call: (408)974-6241. [Exp. #134.]

Association For Women In Computing. Meetings: 1st Wed., 6:00 pm, Stagecoach Restaurant, 44 Montgomery St., San Francisco. Call: (415)979-8450. [Exp. #138.]

Bay Area Video Coalition. A place for independent videomakers to communicate with each other and the larger media community. $10 for nonmembers. Call: Anne Etheridge, (415)861-3282. [Exp. #137.]

Black Data Processing Associates, Silicon Valley Chapter. Meetings: 4th Thursday, 6:30 pm, Amdahl Corp., Bldg. H, 1240 E. Arques Ave., Sunnyvale. National network of DP professionals, educators, students, and vendor reps. Call: Willie Mackey, (408)280-7624. [Exp. #137.]

Business Marketing Association. Meetings: 4th Wed., 11:30 am, Marriott Hotel on Great America Pkwy., Santa Clara. A professional organization for business-to-business marketing professionals; CBC certification, topical programs, seminars, job bank. Call: (408)365-9815. [Exp. #138.]

Center For Software Development. 111 West Saint John, Ste. 200, San Jose. A nonprofit corporation whose goal is to help software businesses grow and bring better products to market more rapidly. Call: (408)494-8378. [Exp. #133.]

Computer Professionals For Social Responsibility/ Berkeley Chapter. Meetings: last Sun., 3:00 pm, BMUG Offices, 2055 Center St., Berkeley. Meetings are open to the public and free. Call: Karen, (510)987-0567 or *cpsr-berkeley @cpsr.org* . [Exp. #137.]

Contra Costa Networking Forum. Meetings: monthly. Creating an electronic community network in Contra Costa County. Call: TEIRNET, (510)689-6016. [Exp. #133.]

Electronic Personal Memory Organizer Development Society. Meetings: 2nd and 4th Tues., 7:40 pm, Mr. Q's, 25 Main St., Tiburon. Free introductory exchange for electronics engineers, investors, and all interested parties. Call: 1-800-386-3477. [Exp. #133.]

Historical Computer Society. 10928 Ted Williams Pl., El Paso, TX 79934. A nostalgia group for enthusiasts of older computers and their history. Main forum is Historically Brewed newsletter; $18/yr., $3 sample. Call: David A. Greelish, (915)822-2683. [Exp. #133.]

IEEE San Francisco Computer Society. Meetings: monthly, SF State University. Call: (415)905-4400. [Exp. #133.]

Independent Computer Consultants Association, Northern California Chapter. Meetings: 2nd Tues., 6:00 pm, The City Club, 155 Sansome St., San Francisco. Open discussion, questions and answers. Call: (415)399-0305. [Exp. #138.]

San Francisco ACM SIGGRAPH. Meetings: 3rd Fri., 8:00 pm, Computer Arts Institute, 310 Townsend St., Suite 230, San Francisco. Computer graphics and animation across a variety of industries including film, multimedia, and video games. Call: (415)642-9605. [Exp. #138.]

Society For Technical Communication, San Francisco Chapter. Meetings: 3rd Wed., 6:00, program at 6:45 pm, Stagecoach Restaurant, 44 Montgomery St., San Francisco. Job listings, guest speakers, technical publications competition, newsletter. Call: (415)985-7121. [Exp. #133.]

Society For Technical Communication, Silicon Valley Chapter. Meetings: 3rd or 4th Thurs., 5:30 pm refreshments, 6:30 pm dinner, 7:15 dessert. Sunnyvale Hilton, 1250 Lakeside Dr. (off Lawrence Expressway at 101). Guest speakers, special interest groups, networking, job listings, newsletter. Call: (408)737-9426. [Exp. #137.]

Software Entrepreneurs' Forum. Meetings: 3rd Wed., 6:30 pm, Elk's Lodge, 4249 El Camino Real, Palo Alto. Industry association dedicated to software developers and entrepreneurs, offering information and education on all facets of the software industry. Call: Barbara Cass,

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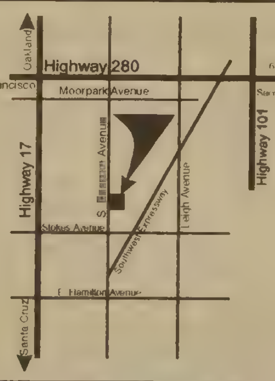

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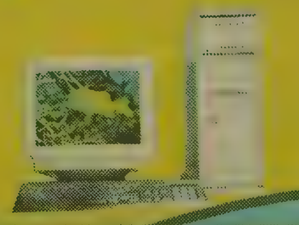

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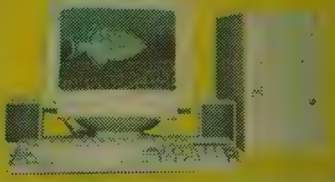

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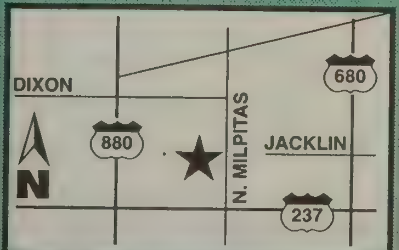

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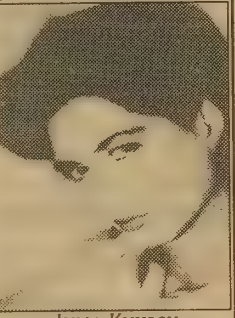
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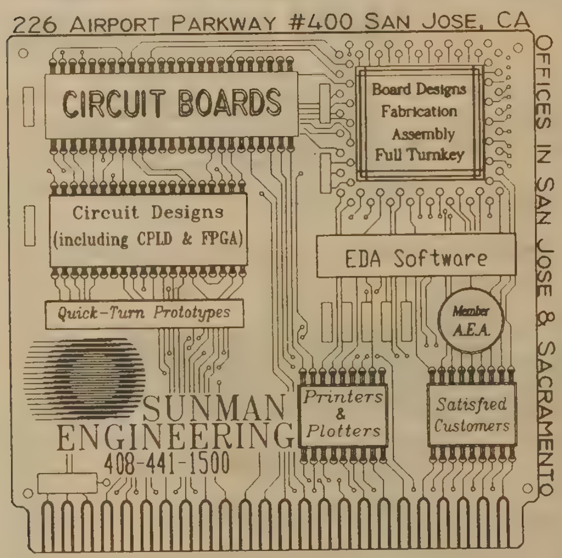

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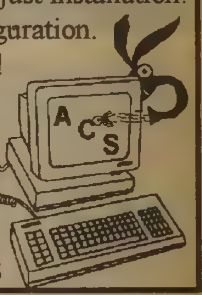

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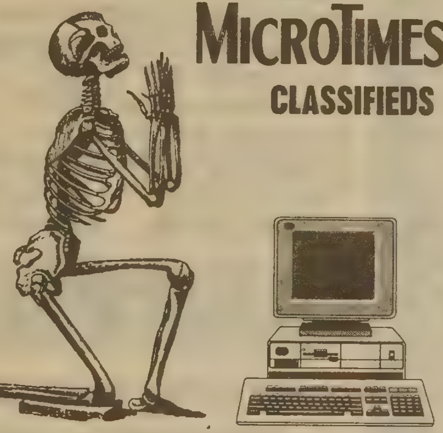

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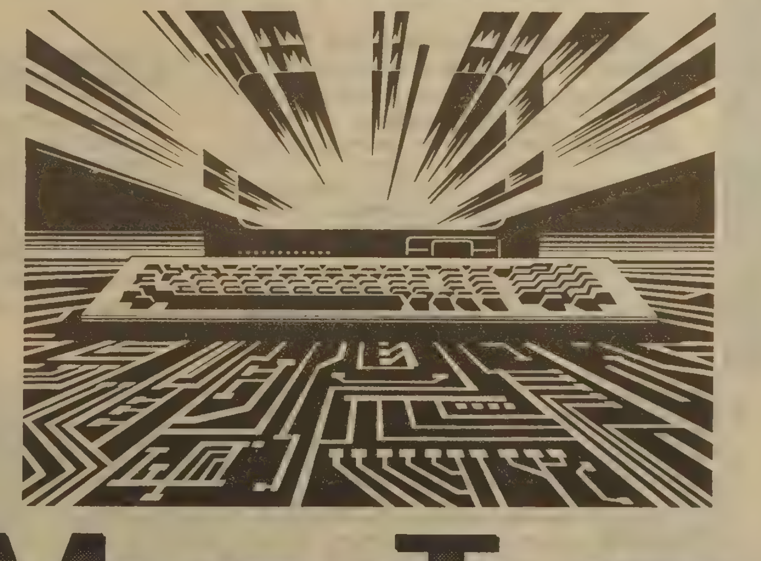

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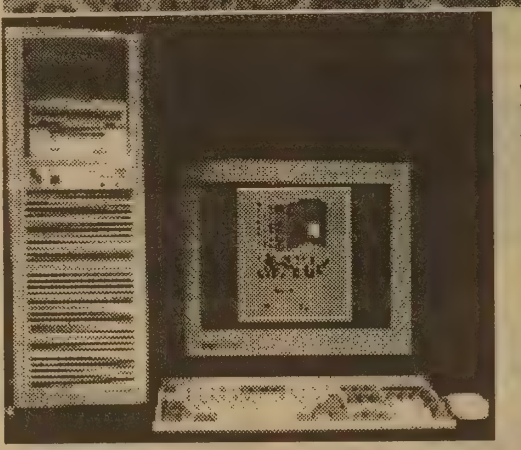

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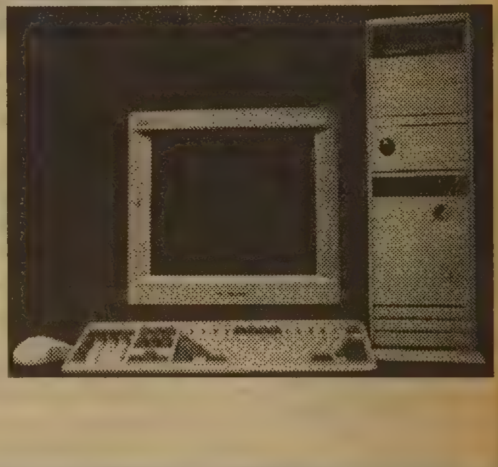

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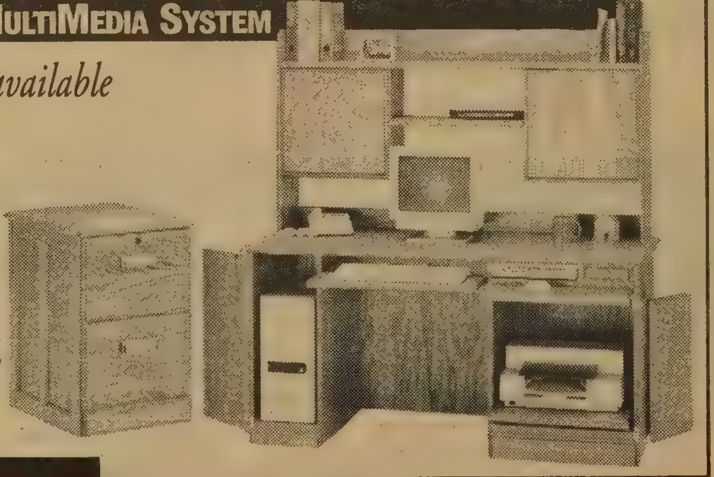

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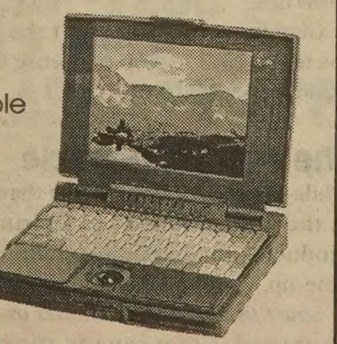

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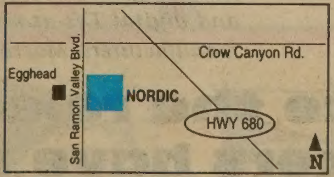

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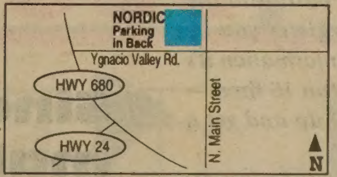

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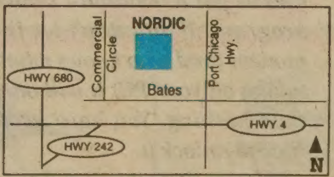

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DVORAK'S LAST COLUMN • BY JOHN C. DVORAK

The Darts And Arrows Column Or What Went Wrong In 1994

(Highlights)

1994 was the year of the weird, highlighted by the Pentium fiasco at the very end of the year. The Pentium fiasco drew attention away from a dubious year indeed.

Here are some highlights of 1994 we all conveniently forgot.

Merger And Dealmaking Mania

We can start with the ludicrous buyout of Intuit by Microsoft. A billion-dollar software company gobbling up another billion-dollar software company. Is everyone in the US Government asleep at the switch regarding these anticompetitive deals?

What's really ludicrous is Microsoft's assertion that it is not being anticompetitive because as part of the deal it will give Novell its own product, Microsoft Money.

So here's how it works: You buy out the competitor who is killing your product sales. You give your product to another competitor and suddenly become number one with the product you were originally competing with. You drive the other product, Microsoft Money, off the market (as they will) and say, "Gee, this wasn't anticompetitive, was it?" The dumfux in the government antitrust office say, "Duh, I guess not."

Give me a break! Weren't the Democrats elected in 1992 to stop nonsense like this? No wonder they got thrown out.

The Delrina Debacle

While there are a lot of things that need fixing in the newest release of Delrina's WinFax products, the marketing could really use a tune-up. Here's a typical complaint:

Saw this package at Comdex and was pretty impressed. Got a copy in the mail today. Skimming through the manuals I find out they've got a deadman switch built into the program. If you don't let it register you by modem (and who knows what information it's taking off your PC) it will only run 15 times—then nothing. You have to call up and get a code to unlock it.

I know these guys are from Canada, but are they totally clueless? After paying American dollars for the product, the user is now held hostage until he calls up and tells them anything they want to know? I think you should blast them. And offer $20 and an autographed picture to the first guy who sends you a patch to disable this nonsense. I won't load the stuff, let alone use it now.

I Knew Editors Were Crazy Dept.

Let's not forget last year's Editor of the Year. Scotland Yard arrested an unnamed Editor for hacking a computer system and sending bogus memos, most of which were derogatory, towards upper management. Authorities are going to prosecute this poor guy for doing what he had to do.

Confess Your Sins!

And I assume we heard about the introduction on the WWW of a virtual confessional for all the guilt-ridden out there: *http://anther.learning.cs.cmu.edu/priest.html* What next?

Overlooked Tragedy

The biggest news of 1994 was the unfortunate death of Gary Kildall, industry pioneer, in a California bar. There was a fuss for a few weeks; then suddenly the poor man is totally forgotten as we talk about delays in Windows '95. Also, there were supposed to be odd circumstances concerning the death.

But that was in July, and since then we've heard bupkis, zip, nada. Are we pathetic or what? There wouldn't be a personal computer scene if it wasn't for Gary.

Who's Watching The Store Dept.

Just as we go towards digital video, we read about how the greedy bastards in Hollywood want to muck up the whole technology with all sorts of copy protection like they did with digital audio. Here's a press release (edited) that tells all.

Macrovision Corp. today announced that it would make available a number of its proprietary copy protection technologies for inclusion in digital VCRs, digital video disc players, and digital TVs at no charge to hardware manufacturers. Macrovision expects its new IPPS™ (Intellectual Property Protection System) solution will drive widespread adoption of a new digital VCR and MPEG-2 digital video disc industry standard. If adopted by the industry, Macrovision's IPPS technology would:

1. Prevent digital VCRs from making analog or digital copies of Macrovision copy-protected VHS and 8mm tapes and pay-per-view programs.

2. Prevent digital VCRs from making analog or digital copies of IPPS programs released on digital videocassettes.

3. Prevent to the same extent as Macrovision's current pay-per-view anticopy technology the majority of existing analog VHS VCRs from making copies of IPPS programs released on digital videocassettes or MPEG-2 digital video discs.

4. Incent all digital VCR manufacturers to adopt the IPPS copy protection standard, because noncompliant digital VCRs which do not incorporate the complete IPPS technology could not play IPPS digital videocassettes.

I have no sympathy for it. There is nothing done to protect my intellectual property rights regard photocopying my column! Why do these guys feel so privileged that they have to muck up good technologies with this garbage?

You know it will end up turning the technology into a niche product like DAT became. If writers were of the same mind as these Hollywood types we'd have no such thing as a photocopying machine. Since the release of VCRs, moviemakers have never had it so good, and all they are concerned about is getting ripped off.

Get a clue! All we will get out of this is picture degradation, just like what scrambled satellite broadcasts have brought us. Exactly how you ruin a digital signal is beyond me, but they will do it. Obviously if you can't make an analog recording from even the RF out of the recorder, then the signal is screwed up. But then again, so is that business.

Have a great 1995. ■

Since the release of VCRs, moviemakers have never had it so good, and all they are concerned about is getting ripped off.

Get a clue!

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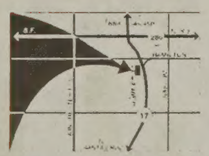

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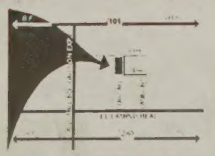

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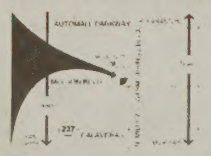

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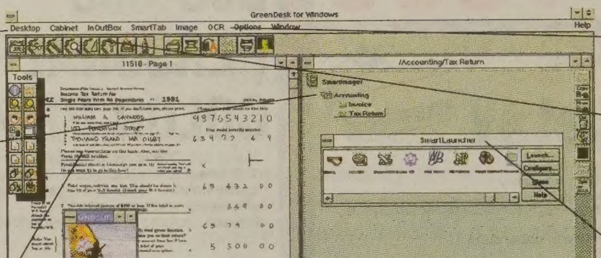
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